Telephony.

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WILSON'S PLEA FOR CO-OPERATION.

This is not a day of triumph, it is a day of dedication. Here muster, not the forces of party, but the forces of humanity. Men's hearts wait upon us; men's lives hang in the balance; men's hopes call upon us to say what we will do. Who shall live up to the great trust? Who dares to fail to try? I summon all honest men, all patriotic, all forward-looking men, to my side. God helping me, I will not fail them, if they will but counsel and sustain me!—President Wilson in his inaugural address.

A President Who Rings True.

Woodrow Wilson has assumed his office as president of the United States, and he has done so in a manner to commend him to every man in the country, regardless of politics.

"This is not a day of triumph," said Mr. Wilson. "It is a day of dedication. Here muster, not the forces of party, but the forces of humanity. I summon all honest men, all patriotic, all forward-looking men, to my side. God helping me, I will not fail them, if they will but counsel and sustain me!"

And there spoke, apparently in all sincerity and humbleness, a man who really does propose to dedicate the next four years to the conservation and the upbuilding of his country and the betterment of the conditions of his fellow men. He forgets the triumph of his party; his is not the glee of the spoilsman. Rather, he sees but the opportunity to work for the good of all, and he accepts his responsibilities gladly, yet soberly, realizing how heavy will be his burden.

Where is he, who, in the face of this earnest appeal for advice, for counsel, can refrain from holding up the hands of this man in every way possible? Is there one, naturally disposed to criticise and minimize either President Wilson's sincerity or his ability, who can fail to give him the benefit of every doubt and assume that he has definitely consecrated himself to a great work, even as most of his predecessors have done before him?

Telephony is disposed to accept President Wilson at his face value, to believe in him, to help him in so far as it lies in our power to do so. We confidently expect an administration of accomplishment, and one which will mean more for the Independent telephone industry than has any previous one.

Positive Value Employes.

Nowadays there is much being written and said about efficiency and what it accomplishes. The Telephone News brings up a point which has not been discussed to any great extent, that of "positive value" employes. Among other things it says:

"The other day an efficiency expert said, 'Up to a certain point the work of every employe is of negative value to his employer.' Quite true; we all realize we must do work equivalent in money value to that sum which stands opposite our names on the payroll, and to cover our 'voucher' expense, or the company will lose money by having employed us.

"But that 'certain point' the efficiency man spoke of, where is it? That's the question. How much service must we return to the company before we can be said to be good investments?

"The real moral to the story, and we're sure there is one, is for each employe to realize the many factors which enter into determining where lies the point which divides positive and negative values. Before we're sure we are worth the money the company pays us, let's be dead certain that we are giving the fullest measure of service; that we are doing our job so as to keep the cost of that job as low as possible. The efficiency of the employe depends upon his positive value. Let us be sure our value is positive and that it's as high as we can make it. When this is accomplished, advancement, without any doubt, comes along automatically."

The Failure

By HERBERT KAUFMAN

Make your chart before you start—choose your destination before you buy your ticket. Don't wait until you have reached the end of your journey and then decide where you're going. Many a man has dried up in a little wayside opportunity, merely because he lacked the courage to acknowledge to himself that his judgment had landed him in the wrong spot.

You can't tell what you're best fitted to do until you've fought for a few things fit for the fighting. Now and then rifles accidentally hit bull's-eyes, but remember that every championship record is the result of a lot of practice and a good, steady aim.

C. Columbus did finally stumble onto America after much aimless wandering, but don't forget that a great many of his predecessors went down in the Atlantic gales because they set sail without a definite port before them.

The builder who hasn't decided how high to run his walls before he digs his foundations takes too much of a chance—he's apt to make his foundations entirely too weak to support the "afterwork."

Know what you are after before you start out for it. The "pig in the poke" system is dangerous. The pig is apt to bite your hand just as often as your hand is likely to grasp the pig.

Don't rely on accident to start you—accident doesn't run on schedule and hasn't a habit of happening in the same spot twice. The Fixed Idea is the motive power that has driven most men to attainment—more plodders than geniuses have reached eminence. The sail boat without a keel is unsafe. Persistence and doggedness oftenest bring results. Hard work is common coin in the realm of Success.

The musician who aspires to become a maestro must look down to years of practice before he can look up to the hour of acclaim, and once he has received recognition he must keep practicing just as hard to hold it. The gift of music and the love of harmony are only half—it's the fixed idea which keeps his fingers on the keys, hour after hour, day after day, that brings him to his goal.

The lawyer and the illustrator and the scientist must all pay the same price. The master of railroads must strive just as earnestly and centralize his efforts just as intensely today as when he was grasping for control.

You must make sure of what you want to do; you must feel sure that you have the courage as well as the temperament to do it, and then Do It.

One fair idea unhesitatingly followed out is better than a dozen excellent plans none of which receive concentrated attention. Spurts don't count. The final score makes no mention of the splendid start if the finish proves that you were an "also ran." Only the steady last. Call to mind a dozen men who have made their mark; choose them from trade or profession, and you'll find that at least ten out of the twelve were men who hung fast to a "fixed idea"—who held on despite setback and reverse—who endured self-denial and difficulties, and won out because they didn't peter out. They believed in themselves; they thought that they could do a certain thing, and counted what they believed far more than the concentrated opinion of everybody else. The world didn't take them seriously in the beginning, but they took themselves seriously, and in the end the world changes its mind.

It always does change its mind when a man makes good. But the world's so old and has had so much experience with the human race that it puts every man down to a basis of zero, and only acknowledges that he's above it when his gauge moves up to the mark that his own confidence has set and his own ability attained.

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Manufacture and Maintenance of Electric Storage Batteries

Paper Presented at a Technical Session of the Sixteenth Annual Convention of the National Independent Telephone Association, Chicago, February 19, 1913—The General Facts and Principles Relating to the Efficient Use of Storage Batteries in Telephone Service

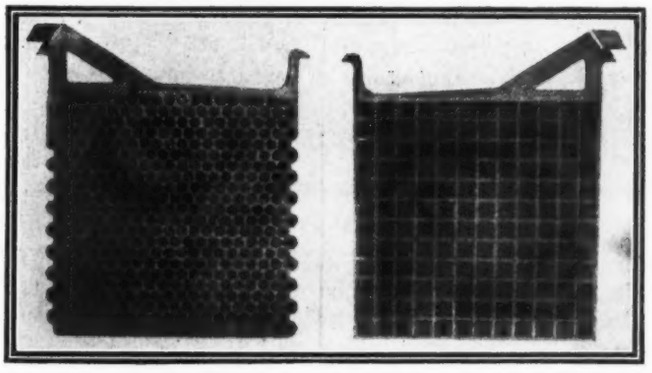
By H. M. Beck, Engineer, The Electric Storage Battery Co.

The lead storage battery dates from about 1860 and was discovered by a Frenchman, Gaston Planté. Planté took two sheets of lead, insulated them from each other, and submerged them in a dilute solution of sulphuric acid in water. He then passed a current of electricity through them and noticed that one, the positive, became oxidized. Upon reversing the current, this oxide was reduced to a finely divided sponge lead and the other plate was oxidized. This combination, namely, sponge lead, dilute sulphuric acid and oxide of lead, constitutes a storage battery and Planté found that if the two sheets of lead were connected through an external circuit, current would flow.

This simple experiment covers the fundamental theory of the storage battery as we know it today. In place of plain sheets of lead, we now use various forms of plates designed to increase the surface exposed to the electrolyte, or to be especially efficient in holding and locking the active material in place. Planté's method of forming the active material by current was very slow and expensive, and electrochemical methods are now used to produce the same results in a much shorter time.

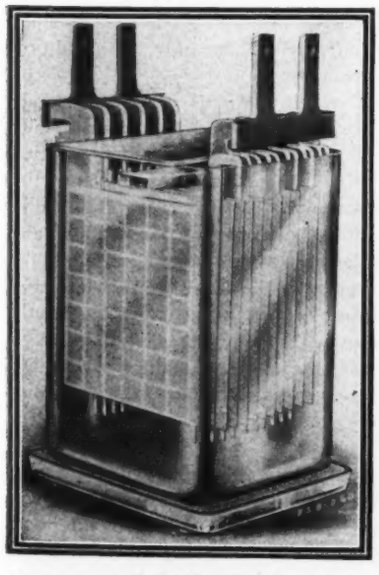
There is another very large class of plates in which the active material is mechanically applied to the plate or grid in the form of a paste or cement, instead of being formed from the body of the plate itself, as in the Planté type, and from the process of manufacture these plates are known as the "pasted" type. These two types of plates, the Planté and pasted, cover practically all those in commercial use today.

A complete storage battery cell consists of the following parts: Two plates or groups of plates, positive and negative, supported in a glass jar or lead lined tank, the latter holding the electrolyte or dilute sulphuric acid. The positive and negative plates are insulated from each other by separators, usually of wood, one of which goes between each pair of plates. On top of the plates, a piece of heavy glass, known as a glass hold down, is placed for the purpose of keeping the separators in place. The glass jars or tanks are made deep enough so that there is a very considerable space under the plates for the collection of sediment, without any danger of its touching the plates and short circuiting them. On top of the jar there is a glass cover plate which performs the double duty of keeping dirt out and the acid in the cells, at the same time considerably reducing the evaporation. The jars or tanks are provided with some kind of a suitable insulating support. In the case of glass jars this support usually consists of a wood or glass sand tray filled with sand for the purpose of providing a uniform support and thus preventing breakage. For lead lined tanks insulators, preferably of the oil type, are used, these resting on stringers or vitreous pedestals.

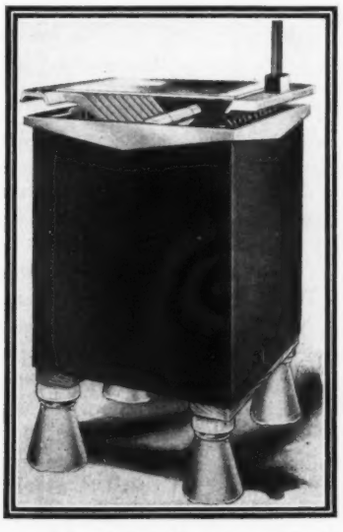


Manchester Positive Plate and the Box Negative Plate.

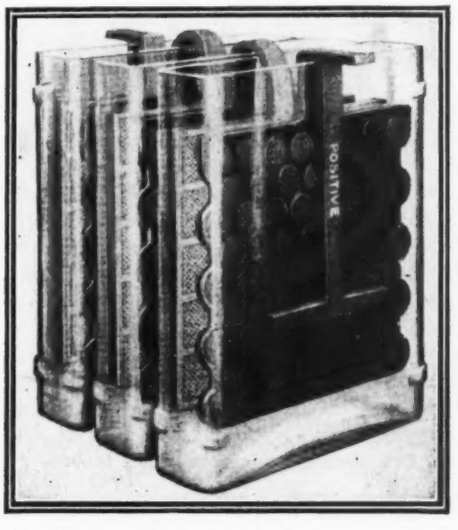
The couple type of cell is manufactured only in the smaller sizes and has been developed rather from the standpoint of convenience than the best battery design. As will be noticed in the illustration, the positive plate of one cell is permanently burned or welded to the negative plate of the next and these pairs hang directly on top of the jars. Thus there are



Glass Jar Storage Battery Cell Resting in Sand Tray.



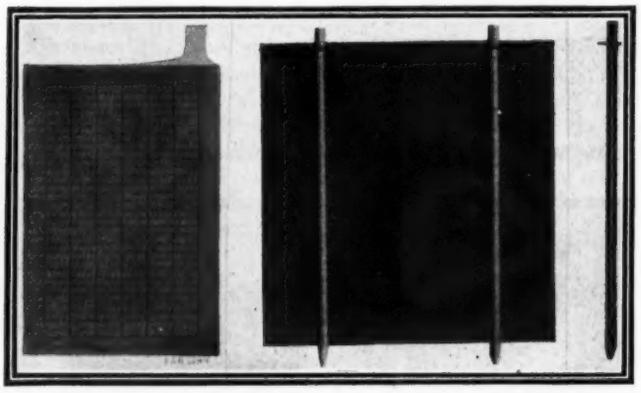
Lead Lined Storage Battery Cell Showing Insulating Support.



Three "Couple Type" Cells—Positive Plate of One Cell Welded to Negative of Next.

no bolted connections except at the terminals and the plates can be very easily lifted out whenever desired for examination or replacement.

In telephone service we use our most rugged positive, known as the Manchester plate. This plate consists of a non-corrosive grid cast from hard alloy, containing a large number of



Exide Negative Plate Separator, Wood Separator and Dowel.

round openings. Into these openings, buttons or spirals of pure lead ribbon, corrugated on one side, are forced under hydraulic pressure. The function of the grid is simply to act as a conductor and furnish a rugged support for the buttons. The buttons alone constitute the active material, and as is seen in the illustration, a very appreciable percentage of this plate is sacrificed in order to gain ruggedness and capacity for standing abuse. Experience has shown that this sacrifice is well worth while, and that where subjected to neglect or abuse, the plate will give less trouble and last longer than types, which under ideal conditions, show a considerably greater life. What is required in any service is, first a cell that will stand up, and second, one that will give the maximum efficiency. High efficiency alone is of little use, if the cell will not stand the service.

The Manchester plate is formed or oxidized by an electrochemical process which reduces the time required, as compared with the Planté method of current reversals, from six weeks to less than two days.

The Box negative plate is used as standard except in the smallest sizes, where the Exide is furnished. This plate consists of a cast hard alloy grid containing a large number of square openings. The faces are covered with perforated lead sheathing, thus making a number of individual enclosed spaces or boxes. These boxes are filled with the active material and are designed with the purpose of holding it securely in place.

The Exide negative plate is used for very small cells which are usually only called upon for comparatively light work. It belongs to the same class as the box plate and differs only in the design of the grid.

The wood separator has now been in commercial use for over ten years. It at first met with decided opposition, and even today there are some operators who prefer the older type made of hard rubber or glass. From a purely mechanical standpoint, something can be said for these older types, but the advantages of the wood separator in other directions are so great that they have been adopted as standard by practically all manufacturers. As will be noted, the wood separator consists of a thin unperforated wooden diaphragm equipped with a number of vertical wooden dowels. These separators hang between the plates and are supported by rubber pins which rest on top of the plates.

The thin diaphragm affords an unperforated wall and thus prevents material from lodging between the plates and causing short circuits. The vertical dowels act as spacers and furnish the mechanical strength required for keeping the plates apart.

Untreated wood contains some very dangerous acids, which unless removed, will attack the positive plates and may ruin them. To obviate this danger, wooden separators are subjected to a chemical treatment which removes these acids and renders them perfectly safe. After the treatment it is necessary to keep the separators in a damp condition as, if they dry out, they shrivel up and are unfit for use.

The wooden separator is not only extremely efficient in keeping plates apart and preventing short circuits, but chemically tends to increase the efficiency of the cells and maintain the capacity of the plates. After being in service they become rather soft and will not stand much handling. Where they are not disturbed, they have a very long life, and in general, constitute one of the most marked advances in storage battery design of recent years.

The location of a battery has much to do with the results obtained. Battery work at the best is not a pleasant duty and where the cells are inaccessible they are sure to be neglected. The room should be large enough so that the cells are all accessible and, except in the smaller sizes, it is preferable to arrange them in one tier.

Good ventilation is extremely important. The gases, hydrogen and oxygen given off from the cells, particularly during the latter part of a charge, if allowed to collect in the proper proportions may become explosive and, while it is a simple matter to prevent all danger from this source, it must not be overlooked.

Hydrogen is very light and collects at the top of the room so that the exhaust should be located in, or near the ceiling and preferably connected to a flue. The inlet should be at the floor and located so that the currents of air will move across the room without forming pockets. In many cases, there is a window at one end of the room and a door at the other. If the window is kept slightly open at the top and an opening left in the bottom of the door, this arrangement will prove fairly satisfactory. A flue is preferable, however, as it is more effective in carrying off the acid fumes and preventing them from spreading through the adjoining rooms.

Good ventilation is essential, not only to take care of the gases given off during the charge, but also in order to carry off the acid fumes and thus keep the tanks, stringers, insulators and surroundings generally, in a reasonably dry condition and prevent excessive depreciation.

For a clear understanding of the methods used for operating storage batteries some idea as to the changes which take place in the cells during charge and discharge is essential. While it is impossible to give an accurate formula for the chemical changes which take place during charge and discharge, certain facts dependent upon them are well established, and these constitute the basis of our operating methods.

First, it should be understood that the term "storage battery" is not strictly accurate, as the electrical current is not directly stored. What does happen is that the current passing through the cell causes certain chemical changes to take place, these being reversible and capable of producing current during discharge. Thus, what is really stored is chemical, and not electrical energy.

Generally speaking, when a cell is fully charged the active material of the negative plate is reduced to a pure lead sponge, i. e., lead in a very finely divided condition so that it offers an enormous surface to the electrolyte. The active material of the positive plate consists of an oxide of lead, and the electrolyte a dilute solution of sulphuric acid and water, there being no acid in the plates themselves, all of the acid being in the electrolyte. As the cell discharges some of the acid from the electrolyte goes into the plates, sulphating the active material of both. At the same time the positive plates lose oxygen.

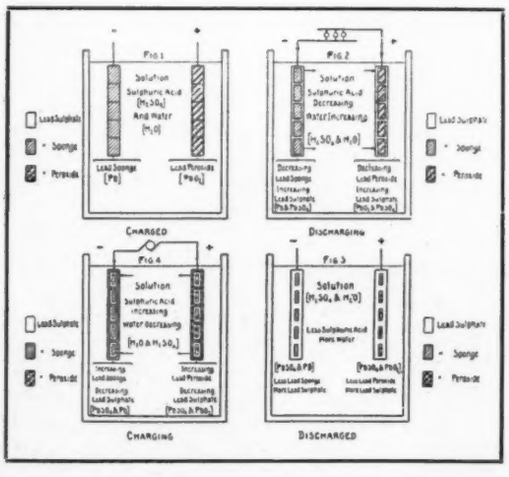
The loss of acid from the electrolyte to the plates causes the specific gravity to fall during discharge and the sulphating

of the active material combined with the loss of oxygen in the positive plates results in the voltage of the cell decreasing. Experience has shown that it is dangerous to the plates to allow these actions to go beyond certain points corresponding to certain voltage and gravity limits, and these have therefore been arbitrarily fixed as the minimum discharge limits.

During charge the sulphuric acid is driven back into the electrolyte from both plates, causing the specific gravity to increase, and at the same time the active material of the positive plate is oxidized. This action combined with the driving out of the sulphuric acid from both plates, causes the voltage to increase. It is evident that when all of the acid has been driven out of the plates into the electrolyte, the electrolyte can not get any stronger, so that the specific gravity reading will reach a maximum and will not show any further increase, no matter how long the charge is continued. Almost simultaneously all the active material of the positive plates becomes completely oxidized. Since there is no further sulphate to reduce, i. e., acid to be driven out of the plates, and no more positive active material to oxidize, the voltage will cease rising and will not show any further increase, even if the charge is continued indefinitely.

It is evident, therefore, that since the current can produce no further chemical change in the cell, this point corresponds to the fully charged condition. In other words, when the voltage and gravity will not rise any higher, the current has produced all the chemical changes possible in the cell, and the cell has been charged to its full capacity. It should be emphasized that the indication of the complete charge is not that the voltage and gravity have reached any given figures, but that they have reached a maximum, or ceased rising. It will be found that under different conditions, and at different times, the same cell will be in exactly the same state of charge, although its actual voltage or gravity readings may vary widely.

It is evident that when the plates no longer absorb the energy of the charging current it must still go somewhere or show itself in some form, and as a matter of fact it shows itself as a more or less violent bubbling or gassing of the electrolyte. In other words, as long as the plates are absorbing the electrical energy being put into the cells, there is very little action evident, but as they become fully charged and can not absorb any further energy, this shows itself in the



Essential Active Element of Storage Cell in Four Stages.

form of a gradually increasing amount of gassing, until finally, practically all of the energy comes off in the form of a gas. Thus, the gassing of the cells forms an additional check or indication of the charge. There should be no gas within the working limits during discharge.

For the average operator, it is neither necessary nor advisable to attempt to go too far into the theory of a storage battery. Let him rather master the few principles which are used under ordinary conditions, and if anything unusual comes up, apply to the manufacturers. Above all, do not experiment.

There are four points in the operation of a storage battery which must be looked out for. If these are properly handled, no trouble need be expected.

1. The battery must be charged properly.
2. The battery must not be discharged too long.
3. Short circuits between the plates must be prevented.
4. The plates must not be exposed to the air. They must be kept covered with electrolyte and only water of a proper purity used for replacing the evaporation.

The most important of these points is the charging. Experience has shown that if charged too much, the excessive gassing washes out the active material of the positive plates, and this decreases their capacity and life. On the other hand, undercharging results in unevenness, sulphating, lack of capacity, and if carried to extreme, will result in a rapid disintegration of the plates. The standard method of charging has been designed to meet both of these conditions to the best advantage.

Charges are divided into two types commonly known as regular charges and overcharges. Regular charges are simply intended to restore the capacity of a battery after a discharge, and are discontinued before the cells are quite full, with the object of obviating harmful gassing. Overcharges, given at intervals of about two weeks, are carried to a complete maximum, i. e., until the voltage and gravity will not rise any higher, and are for the purpose of evening up the cells and keeping them in good condition. The common practice is to continue the overcharge until the voltage and gravity have ceased rising and for one hour after the highest readings are obtained. The intervening, or regular charges, are cut off a little below the point reached on the previous overcharge, usually about .05 of a volt per cell where voltage is used, or five points in gravity, if gravity is used.

The special points to be emphasized in connection with the charges are, in the case of the regular working charges, to cut off promptly. If in doubt, cut off too soon rather than continue the charge too long. On the other hand, in case of the overcharges which are given for special purposes, such as the initial or the first charge given cells when they are put in commission; the regular weekly or bi-weekly overcharge and boosting charges, and those given individual cells or whole batteries for the purpose of restoring them to good condition, when they have gotten into bad shape, the important point is not to cut off too soon. If in doubt continue charging until absolutely sure that the cell has had sufficient, even at the risk of charging too long. A partial charge on these occasions is only a temporary remedy and will probably result in the cells showing poor efficiency and capacity and gradually falling behind until they are in trouble again.

For charging, normal rates are preferable. Too high rates, if maintained, increase the amount of gassing, which is objectionable, whereas at lower rates, the indications of the completion of the charge are not well defined, so that inaccurate charging is apt to result. The usual limits are placed at not less than one-half normal, or over 40 per cent. above normal rate.

Where the cells are large enough to obtain an accurate specific gravity reading, it should be used for governing the charge in preference to voltage. The great advantage of the specific gravity is that the readings are largely independent of the current flowing in the cells, whereas the voltage at any time is directly dependent on the current and varies with it. In very small cells where it is not always possible to get an accurate gravity reading, the voltage is sometimes preferable.

(To be continued.)

The Men Who are Dealing With Telephones.

Below is a late photograph of the men comprising the Interstate Commerce Commission, a body which, as our readers know, has already commenced an extensive investigation of the telephone situation in the United States. Since this photograph was taken, Franklin K. Lane, chairman of the commission, who is sitting at the extreme right of the group, has been appointed Secretary of the Interior, by President Wilson.

Important Discussions at Iowa Convention.

The fact that the Iowa general assembly is now in session will be a leading factor in bringing out a large attendance at the convention next week in Des Moines of the Iowa Independent Telephone Association. A public utility bill of vital importance to telephone companies of the state has been introduced in the senate. In its present form it has features objectionable to telephone interests, but, if properly amended, it is believed it would be a bill fair both to the telephone user and the investor.

Every telephone operator in Iowa is interested in the consideration of this bill and it is hoped that a fully representative aggregation will be at Des Moines, next Tuesday, Wednesday and Thursday, to promote free discussion and take decisive action in the matter.

Planning San Francisco Municipal Plant.

In accordance with a resolution of the San Francisco board of supervisors, plans are being prepared for constructing and completing a municipal telephone system. This work must be done before the proposition of authorizing a bond issue of $6,000,000 for the acquisition of a municipal telephone plant is submitted to a vote of the people.

Ask Receiver for Central Union.

A receiver has been asked for the Central Union Telephone Co. by William Read, Charles J. Spencer and Charles G. Foster, stockholders. This is a step in the injunction proceedings inaugurated a short time ago to prevent the Chicago Bell from taking over the assets of the company. Judge Dever set the case for a hearing on April 2.

The defendants moved that Judge Dever dissolve the injunction granted by him three weeks ago restraining the directors, of whom Bernard E. Sunny is chairman, from holding a meeting in February for the purpose of selling the assets. Judge Dever said he would hear both matters on April 2.

Keystone Statement for January.

The following is the income account of the Keystone Telephone Co., of Philadelphia, for the month of January:

REVENUE ACCOUNT.

	1913.	1912.
Gross earnings	$104,027	$97,913
Operating expenses and taxes	54,412	49,216
Net earnings	$49,615	$48,697
Less interest charges	25,575	25,132
Net surplus	$24,040	$23,565

INTERSTATE COMMERCE COMMISSION: Standing, left to right: Edgar E. Clarke (Iowa), Balthasar H. Meyer (Wisconsin), James S. Harlan (Illinois), Charles C. McChord (Kentucky). Sitting, left to right: Charles A. Prouty (Vermont), Judson C. Clements (Georgia), Chairman Franklin K. Lane, (California).

Manford Savage Again President National Association

Board of Directors Re-elects Retiring President for Second Time—E. B. Fisher Re-elected First Vice-President; N. G. Hunter, Second, and Richard Valentine Re-elected Secretary—All but Two of New Board Present—Finances in Best Condition in History

Manford Savage, of Champaign, Ill., was for the second time re-elected president of the National Independent Telephone Association, at the first meeting of the new board of directors, held on Monday at the association's headquarters, in the McCormick Building, Chicago.

E. B. Fisher, of Grand Rapids, Mich., was re-elected first vice-president, and Richard Valentine, of Jamesville, Wis., was re-elected secretary and treasurer. N. G. Hunter, of Wabash, Ind., was elected second vice-president. The president was authorized to continue Miss N. Thompson as cashier for the ensuing year.

With two exceptions, the full membership of 17 of the board of directors was present at this meeting, as follows:

J. W. Callahan, Chicago.
Manford Savage, Campaign, Ill.
H. D. Critchfield, Chicago.
W. J. Thomas, Shelbyville, Ky.
J. B. Earle, Waco, Texas.
H. C. Todd, Maryville, Mo.
E. B. Fisher, Grand Rapids, Mich.
Richard Valentine, Janesville, Wis.
P. C. Holdoegel, Rockwell City, Iowa.
N. G. Hunter, Wabash, Ind.
L. D. Kellogg, Chicago.
F. B. MacKinnon, Tonganoxie, Kans.
H. B. McMeal, Chicago.
Warren Pratt, Kearney, Neb.
G. W. Robinson, St. Paul, Minn.

The directors not present were E. D. Schade, of Johnstown, Pa., and C. Y. McVey, of Cleveland, Ohio, the latter being detained at home by reason of the serious illness of his daughter.

The new board finds the association with the largest bank balance to its credit in the history of the organization. The books were audited by a public accountant and his report was approved.

The executive committee for the year include President Savage and Messrs. Critchfield, Fisher, Hunter, Valentine, Kellogg and Earle. A finance committee was appointed by the board composed of Messrs. Callahan, Fisher and Hunter, the president being a member, ex-officio. The executive committee was empowered by the board to employ a man to procure memberships and in other ways promote the interests of the association.

A committee of directors will confer with a committee from the Telephone Service Association, looking to the devising of ways and means for the continuation of the work of the latter organization, and this committee will report at the next meeting of the National directors, on March 24. It is probable that a plan will be worked out whereby the two associations may be consolidated; it is practically certain that some means will be devised whereby they will work in complete harmony, to the advantage of both.

The telephone situation was discussed by the directors at considerable length, the general opinion being that conditions are better than for a number of years and that 1913 promises to be a most successful year for the Independent telephone industry.

The new board promises an active campaign for membership and is confident that it will so strengthen and reinvigorate the National Independent Telephone Association as to make membership in it virtually a necessity to every Independent operator. More details of how this work is to be undertaken and pushed will probably appear at the next meeting, March 24, at which time a definite outline of the proposed procedure will undoubtedly be perfected.

Substantial Gift to Massachusetts "Tech."

President Maclaurin, of the Massachusetts Institute of Technology, has announced a gift of $25,000 from the American Telephone & Telegraph Co., through President Theodore N. Vail, in payments of $5,000 annually for five years. The money will be devoted to the care, cataloging and maintenance of the electrical library of the Institute and the purchase of additional books. It is also reported that an added endowment will be made by the same company for the purpose of electrical research work at the Massachusetts Institute of Technology.

Asks New Franchise in Aurora.

The Interstate Independent Telephone & Telegraph Co. has asked for a new franchise in Aurora, Ill., fixing the maximum rates at $48 for business and $24 for residence service. The company proses to expend from $75,000 to $150,000 for local betterments.

Federal Employes' Association Meets.

The second meeting of the Federal Telephone Association, composed of employes of the Federal Telephone & Telegraph Co., of Buffalo, N. Y., was recently held and a considerable number of members was present. The meeting this time was given over to a musical and vaudeville entertainment, in which the performers were all taken from among the Federal "boys." And, from all reports, it was a grand occasion.

DIRECTORS AND COMMITTEES OF NATIONAL ASSOCIOTION FOR 1913

DIRECTORS

Manford Savage, Illinois.
E. B. Fisher, Michigan.
J. W. Callahan, Illinois.
N. G. Hunter, Indiana.
H. D. Critchfield, Illinois.
J. B. Earle, Texas.
C. Y. McVey, Ohio.
H. C. Todd, Missouri.
W. J. Thomas, Kentucky.
Richard Valentine, Wisconsin.
P. C. Holdoegel, Iowa.
L. D. Kellogg, Illinois.
F. B. MacKinnon, Kansas.
H. B. McMeal, Illinois.
Warren Pratt, Nebraska.
G. W. Robinson, Minnesota.
E. D. Schade, Pennsylvania.

FINANCE COMMITTEE

J. W. Callahan, Illinois.
E. B. Fisher, Michigan.
N. G. Hunter, Indiana.

EXECUTIVE COMMITTEE

Manford Savage, Illinois.
H. D. Critchfield, Illinois.
E. B. Fisher, Michigan.
N. G. Hunter, Indiana.
Richard Valentine, Wisconsin.
L. D. Kellogg, Illinois.
J. B. Earle, Texas.

A Good Program for North Dakota Meeting.

Below is given the program for the two-day convention of the North Dakota Independent Telephone Association, to be held at Valley City, N. D., next Tuesday and Wednesday. It is especially urged that representatives of small companies attend the meetings, because special attention is to be given to practical questions affecting the every day operation of rural lines and small exchanges. The convention is to be held in the City Hall. Following is the order of business:

TUESDAY, MARCH 11, 1913.

10:00 a. m.—Reception of members and friends by officers and committee.

11:00 a. m.—Convention called to order.
Address of welcome; Mayor L. S. Platou, Valley City.
Response; Hon. J. Carmody, Hillsboro.

2:00 p. m.—"Telephone Legislation:" Hon. Tracy Bangs, Grand Forks.
"The Problem of the Growing Town"; H. M. Wilson, New Rockford.
"Bookkeeping Essential for Small Companies;" R. P. Baird, Fargo.
"Handling of Complaints;" Frank Bracelyn, Fargo.
"Co-Operative Companies"; A. J. McInnis, Dazey.
"Co-Operation"; O. T. Bryant, Napoleon.

5:00 p. m.—Executive session.

7:40 p. m.—"Getting the Business"; F. L. Shuman, Bismarck.
"Good Will"; M. G. Stokesbury, Grand Forks.
Open parliament.
Salesman's talks.

9:00 p. m.—Reception at Commercial Club.

WEDNESDAY, MARCH 12, 1913.

Time up to 11:00 a. m. given to visiting exhibits of manufacturers.

11:00 a. m.—"Telephone Traffic"; Paul Bunce, Fargo.
"The Operator and Her Relation to Public"; Eva McCready, Minot.
"Selecting and Instructing Operators"; Harriet Fleming, Bismarck.

1:30 p.m.—Address; J. C. Kelsey, Chicago.
"Encouraging Efficient Employes"; C. H. Coar, Minot.
"Revenue Problems"; L. D. Richardson, Fargo.
"Delinquents"; R. L. Welliver, Williston.
"The Pioneering Problem"; J. E. Lewis, Hettinger.
"How to Prevent Trouble"; J. P. Smith, Beach.

5:00 p m.—Executive session.
Election of officers.
Choosing place for next convention.
Unfinished business.

7:30 p. m.—Entertainment; Normal Auditorium.

Brazos Valley Buys San Antonio Company.

The Brazos Valley Telephone & Telegraph Co., of Waco, Texas, has purchased the telephone system of the San Antonio Telephone Co., of which D. A. Walker was the principal owner. It is stated that the purchasing company will make extensive improvements, not only to the San Antonio property, but to its long distance lines. It will construct a new long distance line between San Antonio and Dallas.

At a meeting of the directors of the San Antonio Telephone Co., following its sale, the following officers were elected: President, J. B. Earle; vice-president, Ben C. Hyde; secretary and treasurer, E. C. Blomeyer.

Mr. Walker will remain in charge of the company until the new officials have made their arrangements to take over the management. He has controlled the San Antonio Telephone Co and been its general manager for the last ten years.

A. I. E. E. Lectures on Radioactivity.

It has been found necessary to change the dates for the series of lectures on "Radioactivity" to be given by Professor Edwin P. Adams, of the Palmer Laboratory of Princeton University, under the auspices of the electrophysics committee of the Institute, of which preliminary announcement was made in a previous issue. The lectures will be given on Wednesday evenings, March 19 and 26, and April 2 and 9, in the auditorium of the Engineering Societies Building, 33 West 39th Street, New York.

Following is an outline of the topics to be treated in the four lectures:

LECTURE I—MARCH 19.

The discovery of the property of radioactivity.
Radium and its preparation.
Ionization of gases.
Nature of the radiations from radioactive substances—alpha, beta and gamma rays.

LECTURE II—MARCH 26.

The disintegration theory of radioactivity.
The distribution of radioactive substance.
Radium and the age of the earth.

LECTURE III—APRIL 2.

Dependence of the mass of an electron on its velocity.
The electron theory of matter.
Electrons in optical theory. Zeeman effect.
Emission and absorption of light.

LECTURE IV—APRIL 9.

Metallic conduction.
Indication afforded by the study of radioactivity regarding the structure of the atom.
Optical phenomena in moving bodies.
The principle of relativity.

The lectures will be open to the membership of the Institute. The members of the American Society of Mechanical Engineers, The American Society of Civil Engineers, The Electrochemical Society, and the Illuminating Engineering Society have also been invited.

A First-aid-to-the-injured Plan.

Chicago is to have a brand new kind of telephone service—a municipal "first-aid-to-the-injured"—if an ordinance now being drawn up is passed.

A unique method is planned of making the Chicago Telephone Co. and the desk sergeants in all police stations united with every physician in the city in forming a gigantic "first-aid" service to every Bell telephone subscriber who meets with a sudden serious accident or needs medical care in a hurry.

As soon as the new service goes into effect any one who needs immediate medical attention but who does not know where the nearest doctor can be found, or who hasn't time even to look in a telephone directory, will merely call Main 13, the same number used for police calls.

The line will at once be connected with the nearest police station. The desk sergeant will turn to a precinct map to be drawn up by the map department, which will show the location and telephone number of every physician in the district. He will then send the nearest physician to the residence from which the "first-aid" call came. In the event of the doctor being out the sergeant will continue calling until he has obtained medical help.

"It will make the desk sergeant of every police station in Chicago a real 'first-aid-to-the-injured' in the truest sense of that phrase," says the author of the proposed ordinance. "It is a measure absolutely humanitarian."

Some Phases of Efficiency in Modern Business Life

Conclusion of a Discussion Prepared for Delivery at National Convention by Assistant Professor of Business Administration, in University of Wisconsin, Who is Also Member of Staff of Alexander Hamilton Institute, New York City

By Ralph Starr Butler

Up to this point I have been talking about efficiency principles as applied to those who work chiefly with their hands. Now, I want to say a few words about the application of the same principles to those who work chiefly with their heads—those from whom manual skill is not required. For the sake of convenience, we shall call them brain workers, without in any way implying that the skilled manual worker doesn't work with his brain too.

I have been considering the popular conception of efficiency, and therefore I have had to start with the hand workers. But I have started at the wrong end. Efficiency in any organization does not begin with the "hands" in the factory or in the switchboard room. It begins with the brains in the front office.

About a year ago a convention was held in New York of those who are interested in the efficiency movement; and out of this convention merged the Efficiency Society, an exceedingly interesting organization that is doing many important things in a quiet way. Many strong speeches were made at this convention by some of the foremost manufacturers of the country. And what did they talk about? Time studies? Motion studies? Machine efficiency? Not many of them. The great majority of the speeches called attention to *executive inefficiency*, and prophesied that, if the efficiency movement is to mean anything at all, it is to mean greater efficiency on the part of the men who direct industry.

The place to begin an efficiency study is at the top of a business. Carefully prepared standardized operations at the bottom and 75 per cent. wasted efforts at the top are like a big, well-equipped army in the field with an inefficient general in command. The results are likely to be about as hopeless in either case. If a business is inefficient, it is inefficient because the man at the top is inefficient; and if a business is efficient, you will find at the top a man whose brain is trained as carefully as are the hands of the operatives.

In every business and in every department of a business there is some one man who supplies the force and driving power to move the machinery way down to the smallest cog. Is that man you? If he is, are you taking advantage of your opportunities? Has your efficiency investigation begun with yourself?

What are some of the principles of efficiency for the man who works chiefly with his head? What does executive efficiency mean—and by executive efficiency I mean the efficiency of all those who work chiefly with their heads—who direct any group of activities now, or who are ambitious enough to want to join in the future the ranks of those who do the directing.

Executive efficiency is not a matter of standardized operations. It has nothing to do with machine methods and motion studies. It is something entirely different from any of these. And yet the underlying principles of all efficiency are the same.

Let us attempt another definition: efficiency means the possession of the right sort of knowledge and the ability to apply it. That certainly is a part of the efficiency problem of the hand worker; and just as certainly it is all of the efficiency problem of the brain worker. Knowledge and the ability to apply it! There is the executive's problem in a nut-shell.

In business today the man who knows is the man who wins. Definite, exact knowledge is the key that unlocks the door to advancement. Narrowness, lack of vision and over-specialization are obstacles to success. Breadth, vision, and broad training are the characteristics of the successful.

Specialization is Necessary.

Specialization, however, must not be neglected. There are two kinds of knowledge the efficient brain worker must possess; and the first kind is definite, exact, complete knowledge of the immediate work he is called upon to do. Never before has greater specialization been demanded in the business world. The first requirement of every man is that he learn his job, and learn it so well that no one knows it better than he; that is the price of his keeping his position.

The manager of the telephone company must know the telephone business from A to Z; the new business solicitor must know his customers, his proposition, and himself; the lineman must know all there is to be known about his work. No one escapes the responsibility of exact knowledge of his own particular activity.

This, then, is one of the two great tendencies in modern business—the constantly increasing demand for greater specialization. And contrasted with it, there is another tendency, just as marked, and seemingly in opposition. This other tendency is the rapidly growing demand for executives whose knowledge is broader than their own particular businesses; whose visions are not confined by a balance sheet; whose sympathies are broad enough to enable them to know the meaning of co-operation; whose training permits them to see the inter-relations of all the different kinds of activities and to bring together in harmony all the varied working units that may be under their supervision. Listen to Myron T. Herrick, ex-Governor of Ohio:

"The president of a railroad, bank, or of an industrial or commercial enterprise, who is conscious of new conditions, will not surround himself with untrained men whose capacity is limited to routine clerical duties. Competition demands that the employer have efficient, broadly trained labor in the shop and in the office. He must have about him men whose training has made them capable of successfully assuming larger and larger responsibilities."

The narrowing effect of over-specialization is nowhere better illustrated than in the faults of typical present day organization. E. St. Elmo Lewis says that there are three chief faults of organization. The first is that we have too many departments—too many titles; and he illustrates his point by telling of the work of Major Hine who has been putting the Harriman lines on an efficiency basis. Let me quote from Mr. Lewis to show the conditions Major Hine has been trying to destroy:

"Suppose the maintenance-of-way engineer sitting in the tail end of the train. The train stops. The brakeman jumps off and goes back 50 instead of 150 yards, sits down on the side of the track, lights his pipe, unfolds a newspaper, and forgets the world. When the brakeman comes back, the engineer says to him, 'Don't you know the rules require that you go back 150 yards?' The brakeman would probably tell the engineer to go to a hot place. He further informs the engineer that he is not working for the maintenance-of-way department at all, but for the operating department.

The maintenance engineer may report the matter to the

operating department. Now here comes the trouble. Immediately the operating department proceeds to defend its employe. In that organization people are working for the maintenance-of-way department, or some other department; they are not working for the railroad company. It is a crying fault in all corporations, or nearly all, that men are working for the sales department or the auditing department; they are not conscious that they are working for the corporation."

The condition described by Major Hine and Mr. Lewis is not unusual; and out of it grows the second fault of many organizations—lack of co-operation between departments.

The telephone company is selling service—nothing else. Your advertisements preach service, and your solicitors proclaim it. How about your complaint adjusters and your operators? Do they give service? Does one department ever annul the effects of months of good-will work on the part of another department? Such things are not unknown, even in the telephone business.

The third fault of organization includes all the others—it is simply over-specialization within the departments. The employes in one department know nothing about the work of another. Is is natural to expect co-operation under these conditions? If the collection department does not have the point of view of new business department, do you suppose that the collectors can do their best work? If the solicitors know nothing about the work and difficulties of the collection department, are they likely always to get the best class of subscribers? Over-specialization means leack of co-operation and consequent inefficiency; and the bigger the business, the truer this statement is.

Co-Operation Essential.

Let us look into this matter of departmental co-operation a little more closely. A new man comes into the employ of the company. He is required to learn the technique of his position; the demands of specialization require it. He becomes a cog in a department. Is that good for him? Should his education stop there? Is there any reason why he should study the work of any department except his own?

Look back on your own experience, and find the answer. In the days when you were struggling upward, did you ever forget that the company was everything and that the department was nothing in comparison? Did you ever watch the boss as he came in for a couple of hours a day, smoked a good cigar, dictated a few letters, and then departed for an afternoon at the golf links—did you ever think of the boss disrespectfully and decide that he didn't earn his salary?

If you were selling goods, did you ever think of the factory as an institution whose chief purpose it was to hold back your orders? And, if you were in the producing end of the business, did you ever think of the salesmen as malign individuals who spent their time thinking up unreasonable demands to make upon the factory? You are scarcely human if you never had these thoughts. But is it necessary that this departmental jealousy and lack of co-operation shall always exist? Are there not methods of changing these conditions?

The conditions need not exist; there are methods of changing them. The key to the change is found in broader training for employes. The time has gone when specialization alone was sufficient for the highest success. The present demand is for men who know more than their own little duties. The best co-operation is secured where all employes know something at least of all departments. The man who goes higher, from the accounting department for instance, is the one who knows more than merely accounts—he has trained himself to know the problems of the solicitor, and of the operating department, and of all the other departments in the business. The man who gets the next highest job is usually the man who has prepared for it.

So much for the necessity of broad training for the subordinate. What about the man at the top? Does he need this same broad training? Suppose that the local manager has come up through the technical end of the business. He finds himself in a man's size job that requires him to open a hundred hitherto unused doors in his mind. He must be a business man among business men. Is the most successful manager the man who knows merely the technique of telephony, or the work of the accounting and collection department, or only the work of the solicitors?

Training for a Big Job.

Can any man hold a really big job—can he be really efficient—unless he knows something about all the important fields of business? The answer is obvious. To be big means to be broad. The narrow specialist never yet realized to the fullest the possibilities of his position. Every man in business who is ambitious to get the job ahead of him must train himself to compete with a thousand other men whose big, broad training makes them dangerous commercial enemies.

We have established the fact that there are two opposing tendencies in business. First there is the immediate demand for intense specialization; and, second, there is the absolute necessity of broad training—the opposite of specialization—for the man who wants to go the farthest in his chosen work. Is this a hopeless dilemma, or is there a way out? What can you as individuals do to solve the problem? We need say nothing about the methods of securing specialized knowledge of your own immediate work; that is taken care of by the technical schools and by the experience you get in your every-day activities. I want merely to suggest some ways of getting the necessary broad training, the broad general knowledge, that modern conditions demand.

You can't get this through practical experience; the opportunity is seldom offered nowadays; and, if it is, the school of experience is too wasteful as a teacher of general principles. There will, of course, always be the exceptional man who will come up through routine training, and dominate his field by force of intellect; but in the main the new conditions demand a broad training outside of one's own experience, which only a study of the experience of others can give.

What is it that the executive needs to learn that he cannot get out of his own experience? I take the stand that it is his duty to study the science of business. What? A science of business? Exactly that. Are there principles of business which justify business being called a science? There are some, and more are constantly being developed. The idea of a science of business should not astonish us. Science doesn't necessarily have to be developed by a long haired professor in a dusty laboratory. Science is merely organized knowledge, and if we take the known facts of business and organize them in a logical way, we have a science of business.

The Foundations of Business Training.

Of course, a complete science of business is only in process of accomplishment; but a great deal has already been done. There are certain well defined principles relative to the founding, financing, and managing of a business the keeping of records, and the methods of buying and selling. We may call these principles organized business knowledge. The man who learns them is putting himself in a position to profit from the experience of others.

The various university schools of business recognize that the man who is training for business must have the broad foundation provided by a knowledge of all the principles

that have thus far been developed. When a young man comes to the university, we do not ask him what branch of business he is going into. We don't try to find out if he is going into salesmanship, for instance, in order that we may teach him only the methods and principles of selling. That isn't our policy at all.

We require all of them to study the economics of business, organization and management, finance, money and banking, the principles of investment accounting in all its forms, advertising, buying, selling, and commercial law. We don't expect that every student who studies accounting, for example, is going to become an accountant; but we do know that no man who directs a business or who has a responsible position in it, can do his best by himself or his employer unless he knows the basic principles of accounting. And the same principle applies to all the other subjects that we teach to students of business.

What does this mean for the man actually in business, who has had the best of specialized training in his own work, but who has not had the opportunity to get the broad general training that modern conditions demand? Can he get this broad training out of his own experience? Not very often. Must he, then, go back to the university, and give up his active career for a while in order to prepare the better to continue it? That would be unthinkable.

Fortunately there are some institutions that have recognized the growing demand of men actually in business for the broad training their own experience does not give them. At the University of Wisconsin, for instance, we are trying to carry our commercial training, by correspondence courses, to the people of the state who cannot come to the campus to get their training. During the past two years we have had the privilege of helping to broaden the point of view of well over a thousand business men of Wisconsin who were in the thick of the business fight, and yet who realized the necessity of stocking up with a new supply of ammunition that would spread farther and carry longer than the ammunition they had been using.

Wisconsin is not alone in this movement to increase executive efficiency. The Alexander Hamilton Institute, for instance, is doing nationally what we are trying to do locally. Its slogan is: "Complete and exact business information—the basis of efficiency." The slogan is good, and the work that is being accomplished is good.

Efficiency, then, is something more than mere mechanical processes. It does not mean merely stop-watches and motion studies and driven employes. Even for the hand worker it is something far more vital than that. For the employe who works with his hands as well as for the employe who works with his head, scientific management—which produces efficiency—is opportunity—opportunity for good health, for good work, for good pay, and for advancement; and all of these from the employer's point of view spell simple justice the fair deal.

But efficiency is not concerned solely with the hand workers. Efficiency does not begin at the bottom of an industry; it begins at the top; and the employer who fails to recognize this fact is not headed in the right direction. Executive efficiency is the real problem; and it is a problem that cannot be solved by standardized processes.

Knowledge and its lack are the elements in the problem—specialized knowledge to enable every man to do his routine task; and broad, general knowledge to reduce friction, promote co-operation, lessen waste, open to the ambitious the door of advancement, and to give to the man at the top the weapons to use and the ability to use them in competition with any antagonist on the keenly contested battlefield of business. This is the real meaning of efficiency. This is the idea that is being spread by many of the leaders in the efficiency movement; and it is the idea that must ultimately be adopted by every business man who wants to make the most of himself and of his organization.

The Telephone Inspector and the Troubleman

Continuation of a Series of Articles Begun in the September 7 Issue of Telephony—They Deal in an Elementary and Explicit Manner With Many of the Problems Encountered by Telephone Men in the Operation of Small Exchanges

By A. E. Dobbs

Some More Trouble.

"Good morning," said George, as he came in the next day. "I have a puzzle for you. Here is a letter I just received from a friend with another telephone company. He writes: 'We have a line that is giving us a great deal of trouble with cross talk. The situation is this: we have a cable containing 50 wires running east from our office. About two blocks from the office running south, we have a branch lead of 12 wires, which make us no trouble. About two blocks farther on is another lead of nine wires, also running south, that is also clear. Farther on are two leads branching north, in which the cross talk is very bad, so bad, in fact, the we can talk to a subscriber over any wire almost as readily as over his own. We use No. 12 wire part of the way for a common return, and the rest of the way, No. 14. When we open any of these lines, they test clear, but the minute we close them, the cross talk is in again, and the current will generally ring half a dozen bells at once.'

"Well, what do you think of it?" asked George upon finishing reading the letter.

"Isn't his return wire rather small?" stalled Will who was busy thinking.

"Yes, but we have some no larger," answered George.

"Perhaps it is in the board," Will suggested as George was waiting for him to say something.

"In that case the trouble should show up when the lines are opened," George returned.

"Say," spoke up Will whose thoughts were now beginning to shape into an idea of the difficulty, "didn't we have something like that when our return wire broke on John street?"

"Yes. Do you think his return wire can be broken?"

"N-o-o-o. He surely would know enough to look that up," replied Will. "Perhaps," he exclaimed suddenly, "he has a bad connection in his return wire, so that the current comes back over the other line easier than over the return."

"Now, you've hit it," said George, "for that is the trouble exactly."

George Attends the National Convention.

Shortly after this conversation, Mr. Risk and George attended the convention of the National Independent Telephone Association at Chicago. There George met several of his old acquaintances and discussed with them many of the problems which came up in their exchanges from time to time. A number of interesting papers were read at the meetings and both Mr. Risk and George obtained many prac-

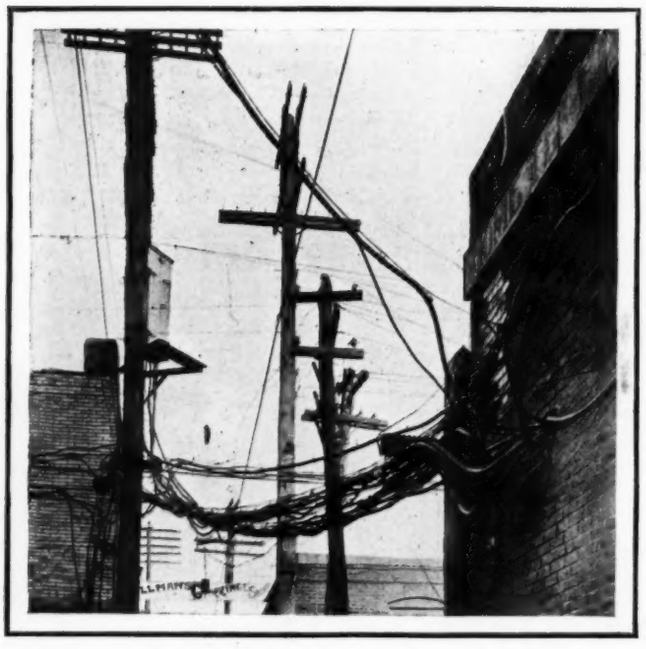


Fig. 53. Manner in which Cables Entered Old Exchange.

tical ideas regarding various phases of telephone operating.

They were brought into contact with men who advocated plans and business methods that were entirely different from those which they had followed. The achievements of some of the men surprised them and they realized that, although the system centering at Independence was in good operating condition, there were many ways in which it could be improved, especially if looked at from the viewpoint of others.

The next day after returning from the convention George stepped into the shop to see how Will was getting on and to tell him something about the convention.

He had just finished testing out a set when George entered. "I suppose you saw a number of your old friends at the convention?" Will remarked after shaking hands with George.

"Yes," replied George, "I met Dick Hansen whom I had not seen for about eight years. He had some interesting things to tell me about the plant with which he is connected. He had just finished rebuilding the plant and brought a number of photographs along with him to Chicago. He took some of them before the work started and then others after it was completed. As he had extra prints he gave some of them to me.

"The original installation was of the magneto type with all lines grounded and independent of each other. The extent of the pole and cable plant was very limited. Service was not given outside of the town limits and the company had no toll line facilities."

"The plant was evidently not as good as the one we have here," remarked Will.

"I should say not," responded George. "Look at this view of the cables (Fig. 53) going into the building. Isn't that a nice assortment? You see after the original entrance cable capacity was reached, one small cable after another was added as needed and naturally a good job was not done.

"Here is a view (Fig. 54) of the upper part of the pole on the left in the other photograph (Fig. 53). It shows the way in which the cables were brought out to the office pole and from there to the open wires. These conditions fortunately are not often found in the present day exchanges."

"What became of all those open wires shown on the upper part of the pole?" asked Will.

"The entire outside plant was practically rebuilt," responded George. "In the business section and thickly settled portion of the residence districts the aerial cable was replaced by underground cable. In the old construction four 10-pair cables were run together for a distance of about 2,000 feet, and on one pole there were some 200 open wires. That class of construction was eliminated in the rebuilding.

"The underground conduit was laid in alleys close to the sides of the building. Multiple conduit of two to six ducts was laid on a hard clay bottom with a covering of two

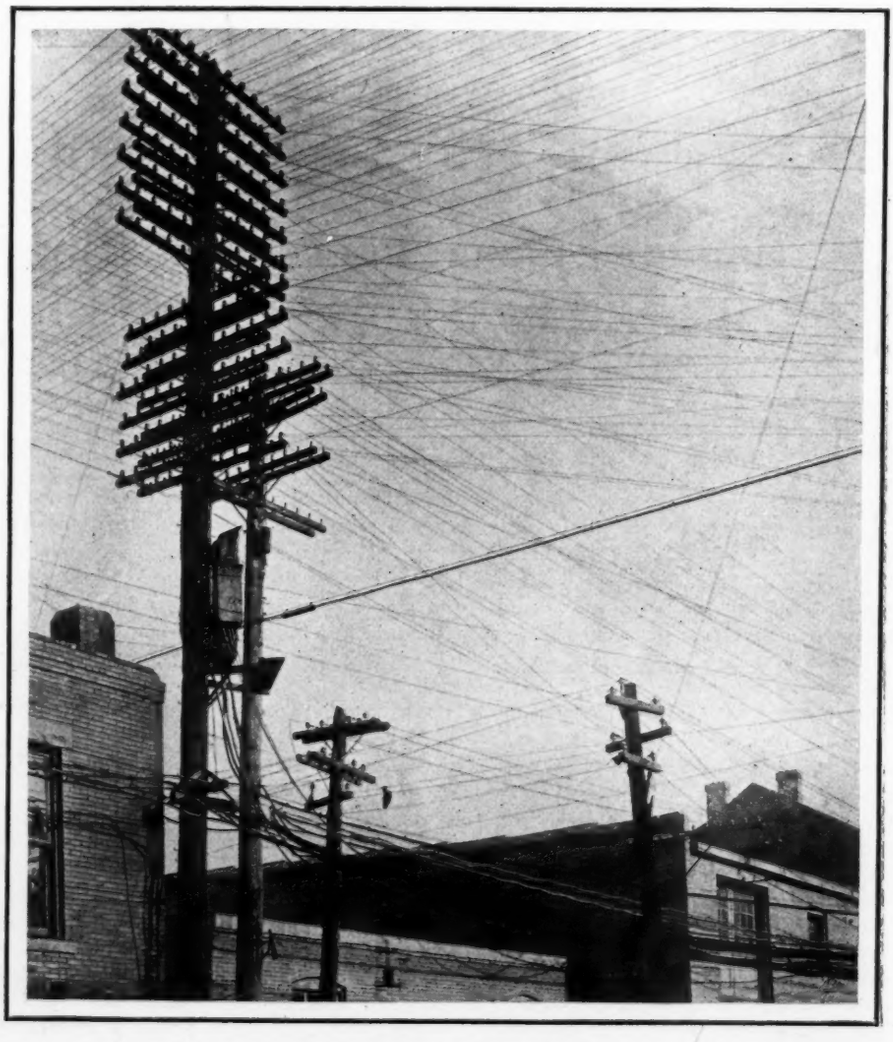


Fig. 54. A Type of Office Pole which is Rapidly Becoming Obsolete.

inches of concrete on the sides and three inches on the top."

"What was the idea in laying the conduit close to the buildings," questioned Will, "I thought that conduit was usually laid near the center of streets."

"That was done," replied George, "so as to avoid interference with pipes and other construction which are usually found when streets are opened up near the center."

"The lines of conduit were laid," he continued, "draining from the center to each manhole, with grade of one inch to every ten feet wherever possible. The manholes were drained to sewers where necessary. They were built of paving brick with cement lining on the inside."

"In laying underground conduit, where do they use asphaltum," asked Will. "I have heard of it being used, but never clearly understood its application."

"Well," responded George, "the sections of duct are held together with little iron pins, called dowel pins, so as to keep them in line. The joint between the sections is usually wrapped with burlap about six inches in width, and then cement or asphaltum is placed over the burlap to make a waterproof joint."

"In the downtown districts," he continued, "distributing poles were placed in the center of each square. This picture (Fig. 55) shows the same office pole that is seen loaded with open wires in one of the other pictures (Fig. 54). You will note that all the cross arms have been removed, and an iron ring, carrying insulators, is placed near the top. A pole can terminal is placed at the very top of the pole. From the underground ducts cable is brought up the side of the pole through a lateral and terminates in the cable can."

"What are all the wires which run out from the iron ring," queried Will.

"Those," replied George, "are the drop wires to the buildings in which the subscribers are located. They are connected with the cable conductors terminating in the can, jumping from the insulators on the ring where they are deadended to the can terminals. The photograph is an excellent view illustrative of the circle top distribution method. This method is, however, going out of use, being largely replaced by the interior block distribution system."

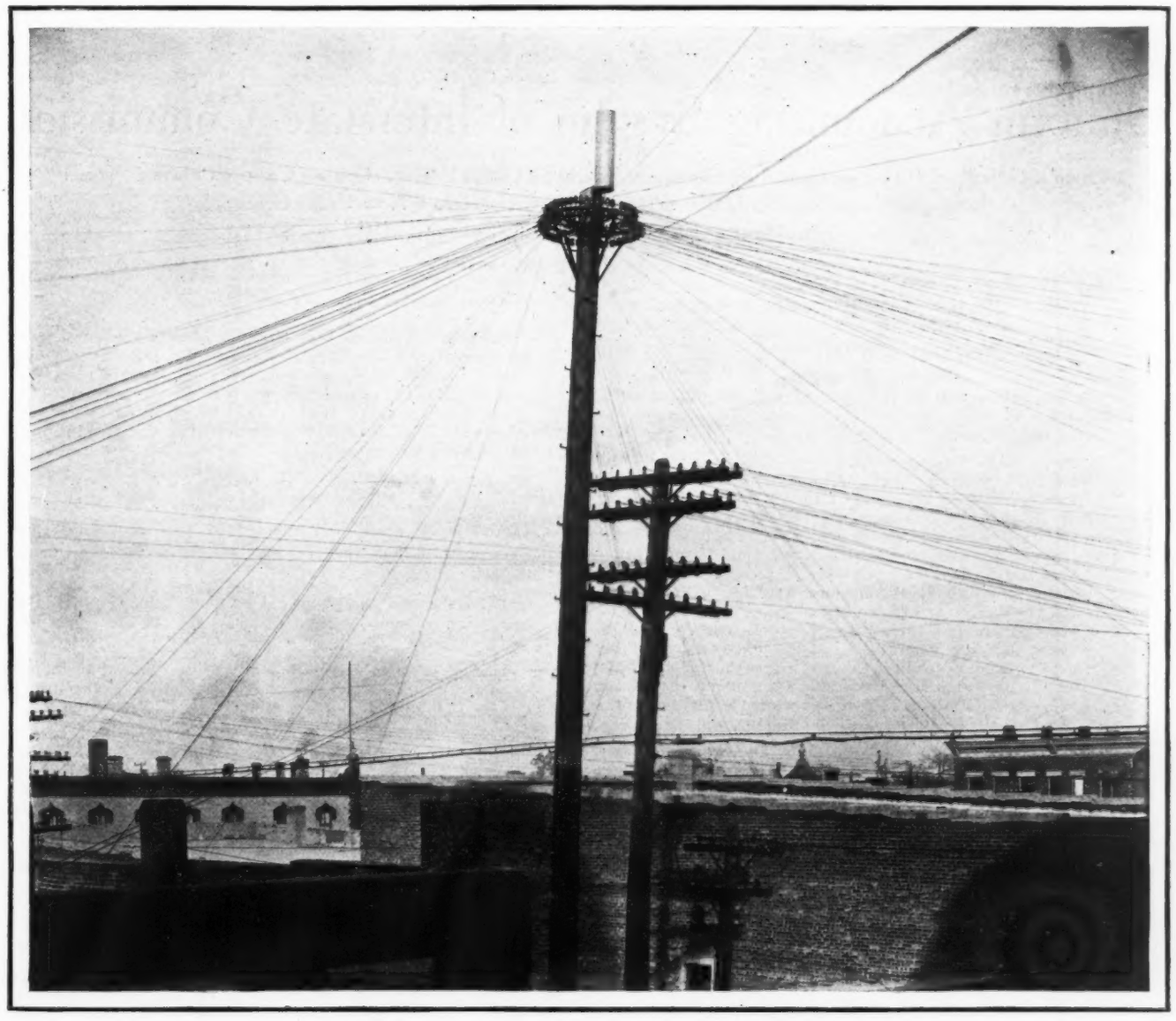


Fig. 55. A Good Illustration of the Circle Top Pole Distribution Method.

"I should think the circle top system pretty good," remarked Will. "What are the advantages of the other distributing method?"

"The circle top pole distribution method avoids the necessity for getting rights of way to run a pole line and one or two distributing poles will usually take care of an entire block especially where the telephonic density is not very

large. But as I said before, it has gone into disuse. The interior block system of distribution has been adopted by many telephone companies on account of its low first cost and maintenance."

"What is the scheme used in that method?" asked Will. "I have a hazy idea that the wires must be run along the sides of buildings and that the cable terminals are also placed on building walls."

"That's the general plan," responded George. "Iron covered cable terminals are placed on the rear or side walls of buildings and twisted pair wire run from them to the various stations. The wires are supported by galvanized iron rings attached to walls or other supports and placed about four feet apart. With this method poles and cross arms are unnecessary and that is one of the reasons for its low first cost. As the terminals and wiring are usually so placed as to be easily accessible and also exposed to view, the maintenance is low. The installation of the wiring and terminals is made so that they are quite well protected from mechanical or electrical injury."

"I shouldn't think the system would be a good one to use in residence districts," commented Will.

"Ordinarily it isn't," rejoined George. "It is especially adaptable for places where the buildings are close together as in the business sections. But frequently it can be used in residence sections near the business part of a town where the houses are quite close together. The wires can usually be run on the fences as they are in such cases quite substantial."

(To be continued.)

Uniform Accounting System of Interstate Commission

Complete Details of Plan Promulgated by Government Body for Use of Every Telephone Company Having Annual Income of Upwards of $50,000—Plan for Smaller Concerns is Now Under Contemplation—System Effective Universally January 1, 1913

340. Amortization of Landed Capital.

Charge to this account during each fiscal period such portion of the original money cost (estimated, if not known) of landed capital as carried in account No. 207, "Right of Way," and No. 211, "Land," as is necessary to cover the proportion of life thereof expired during such period.

Note A.—The amounts charged to this account should be concurrently credited to account No. 103, "Reserve for Amortization of Intangible Capital—Cr."

Note B.—When any landed capital expires or is otherwise retired from service (as, e. g., through sale), the fixed capital account or investment account, if any, originally charged therewith should be credited with the amount originally charged, account No. 103, "Reserve for Amortization of Intangible Capital—Cr.," should be debited with all amounts theretofore credited to such account in respect of such capital so going out of service; the appropriate account should be debited with the proceeds of sale, if any, and any necessary adjustment should be made through the Corporate Surplus or Deficit account.

341. Miscellaneous Deductions from Income.

This account should include all deductions from gross income which are in the nature of fixed charges but not otherwise provided for, such as those required by the terms of some contract, agreement, charter provision, law, or ordinance. Such deductions should not include any appropriations or dispositions of income that rest solely in the discretion of the accounting company.

V. Disposition of Net Income.

350. Appropriations of Income to Sinking and Other Reserve Funds.

This account should include amounts of appropriations of income for sinking and other reserve funds. The terms of mortgages, deeds of trust, or other contracts providing for the allocation of income or for the payment of definite sums into sinking and other reserve funds, and for accretions to such funds on account of income from previous investments, may be made the basis of such appropriations.

The appropriations for payments or accretions to the funds may include amounts equal to (1) direct payments; (2) the interest or dividends on securities issued or assumed by the accounting company and held in such funds; (3) the income from investments in securities (other than those issued or assumed by the accounting company) held in such funds; and (4) the income from cash and other property held in such funds.

Note A.—The amounts charged to this account should be concurrently credited to account No. 172, "Surplus Invested in Sinking Funds," or other appropriate reserve.

Note B.—If appropriations for direct payments are made from surplus, they should be charged to account No. 411, "Appropriations of Surplus to Sinking and Other Reserve Funds."

351. Dividend Appropriations of Income.

This account should include dividends on outstanding capital stock issued or assumed by the accounting company (other than that held by it), if declared from income.

This account should be subdivided so as to show separately the dividends on the various classes of capital stock.

If a dividend is payable to any thing other than money. such thing should be described in the entry with sufficient particularity to identify it.

Note A.—This account should include the dividends declared out of income on all classes of capital stock, except debenture stock. The payments on debenture stock should be charged to account No. 335, "Interest Deductions for Funded Debt."

Note B.—This account should not include charges for dividends on capital stock issued or assumed by the accounting company and owned by it, whether held in its treasury, in special deposits, or in sinking or other reserve funds, or pledged as collateral. (See account No. 350, "Appropriations of Income to Sinking and Other Reserve Funds.")

Note C.—This account should be used if the appropriations are definitely made as chargeable to income. If similar appropriations are made from surplus, they should be charged to account No. 412, "Dividend Appropriations of Surplus."

352. Appropriation. of Income for Construction, Equipment, and Betterments.

This account should include amounts appropriated from income for construction and equipment and for betterments of property carried in fixed capital accounts.

These amounts should be subdivided so as to show—
(*a*) amounts expended during preceding fiscal periods,
(*b*) amounts expended during the current fiscal period, and
(*c*) amounts held in reserve.

Note.—This account should be used if the appropriations

are definitely made as chargeable to income. If similar appropriations are made from surplus, they should be charged to account No. 415, "Appropriations of Surplus for Construction, Equipment, and Betterments."

353. Miscellaneous Appropriations of Income.

This account should include appropriations of income not provided for elsewhere.

Note.—This account should be used if the appropriations are definitely made as chargeable to income. If similar appropriations are made from surplus, they should be charged to account No. 416, "Miscellaneous Appropriations of Surplus."

INSTRUCTIONS PERTAINING TO CORPORATE SURPLUS OR DEFICIT ACCOUNT.

17. **Corporate surplus or deficit account defined.**—This account or summary is the connecting link between the Income Account and the Balance Sheet. It summarizes the changes in the corporate surplus or deficit during a given fiscal period resulting from the operations and the business transactions during that period, as well as those effected by any disposition of net profits made solely at the option of the company by accounting adjustments not properly attributable to the period, or by miscellaneous losses or gains not provided for elsewhere. The corporate surplus or deficit should be shown on the balance-sheet statement under account No. 137, "Corporate Deficit," or No. 174, "Corporate Surplus Unappropriated."

TEXT EXPLANATORY OF CORPORATE SURPLUS OR DEFICIT ACCOUNT.

I. Credits.

400. Credit Balance Transferred from Income Account.

Under this title should be shown the amount of net income brought forward from the Income Account.

401. Miscellaneous Additions to Surplus.

This account should include amounts (not provided for elsewhere) transferred to Surplus from other accounts and amounts representing increases in resources not properly assignable to the income of the fiscal period for which the accounts are stated. Among the items which should be credited to this account are, for example—

Adjustment or cancellation of old balance-sheet accounts (other than fixed capital).

Profits derived from the sale of property carried in account No. 111, "Miscellaneous Investments."

Credits resulting from adjustments required to bring to par securities issued or assumed by the accounting company and reacquired at a cost less than the par volume.

Premium on capital stock at the time of its retirement.

Unextinguished premiums on funded debt retired before maturity.

II. Debits.

410. Debit Balance Transferred from Income Account.

Under this title should be shown the amount of net loss brought forward from the Income Account.

411. Appropriations of Surplus to Sinking and Other Reserve Funds.

This account should include amounts of appropriations of surplus for sinking and other reserve funds. The terms of mortgages, deeds of trust, or other contracts providing for the allocation of surplus or for the payment of definite amounts into sinking and other reserve funds may be made the basis of such appropriations.

Note A.—This account should be used if the appropriations are definitely made as chargeable to surplus. If similar appropriations are made from income, they should be charged to account No. 350, "Appropriations of Income to Sinking and Other Reserve Funds."

Note B.—If appropriations are made to cover the income accruing on sinking-fund assets and to cover amounts equivalent to interest on securities issued or assumed by the accounting company and held in such funds, the amounts of such appropriations should not be included in this account, but should be included in account No. 350, "Appropriations of Income to Sinking and Other Reserve Funds." If appropriations are made to cover sums equivalent to dividends on stock issued or assumed by the accounting company and held in such funds, the amounts of such appropriations may be included in this account or in account No. 350, according as the dividend is declared from surplus or from income.

Note C.—The amounts charged to this account should be concurrently credited to balance-sheet account No. 172, "Surplus Invested in Sinking Funds," or other appropriate reserve accounts.

412. Dividend Appropriations of Surplus.

This account should include dividends on outstanding capital stock issued or assumed by the accounting company (other than that held by it), if declared from surplus.

This account should be subdivided so as to show separately the dividends on the various classes of capital stock.

If a dividend is payable in any thing other than money, such thing should be described in the entry with sufficient particularly identify it.

Note A.—This account includes the dividends declared from surplus on all classes of capital stock except debenture stock. The payments on debenture stock should be charged to account No. 335, "Interest Deductions for Funded Debt."

Note B.—This account should not include charges for dividends on capital stock issued or assumed by the accounting company and owned by it, whether held in its treasury, in special deposits, or sinking or other reserve funds, or pledged as collateral. (See account No. 411, "Appropriations of Surplus to Sinking and Other Reserve Funds.")

Note.—This account should be used if appropriations are definitely made as chargeable to surplus. If similar appropriations are made from income, they should be charged to account No. 351, "Dividend Appropriations of Income."

413. Realized Depreciation not Covered by Reserves.

Charge to this account the realized depreciation (i. e., the difference between the original cost and the salvage, if any) on tangible fixed capital retired, if such depreciation has not been provided for through a depreciation reserve. This includes such portion of the realized depreciation on any physical property which was installed prior to the period for which the reserve was established as is due to life in service before that period. This portion may be estimated on the basis of the proportion which the life in service of the property in question prior to the period for which the reserve was established bears to its entire life in service. (See sec. 23.)

414. Amortization Unprovided for Elsewhere.

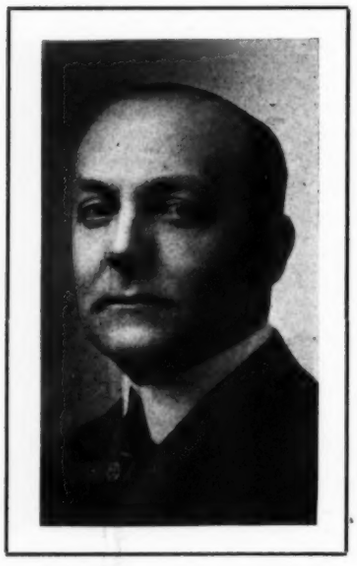
Charge to this account, when any tangible property expires or is relinquished, such portion of its cost as has not been previously written off or is not covered by account No. 103, "Reserve for Amortization of Intangible Capital—Cr." Charge also to this account all optional amortization, such as that of assets carried in accounts No. 201, "Organization" and No. 204, "Other Intangible Capital." (*To be continued.*)

Rather Close to "Saturation."

The Reading Central Telephone Co., of Reading, Mich., has reached a stage of development which surely closely approximates "telephone saturation." On February 1 its records showed 483 telephones in service, 263 in the village and 220 on rural lines. The population of the village being 1,012, this is an average of one telephone for less than every four people. C. G. Fitzsimmons, vice-president and general manager of the company, claims this to be best record in Michigan.

A Quartet of Men Prominent in the Telephone Field

ARCHIBALD THURSTON NAUGLE, vice-president of the Naugle Pole & Tie Co., having general offices in Chicago, has been associated with the Naugle company and the cedar pole and tie industry since 1897. The business was founded by his father and brother in 1886 and claims, therefore, the stability of age and experience. It has, and has maintained since 1898, the only pole yard in the city of Chicago. Born in Indiana December 14, 1874, Mr. Naugle, after completing his education, at once entered the firm and has since then devoted his entire time to the development of the business. He has always been active in the affairs of the Northwestern Cedarmen's Association, has served as its vice-president and president and has aided in many ways in promoting its interests and those of the cedar industry as a whole. Mr. Naugle has travelled extensively, particularly in the Spanish-American countries, having spent three years in Mexico. He is a member of a number of exclusive clubs in Chicago, among them being the Union League Club, the Chicago Athletic Club and the Edgewater Golf Club.



C. R. PIEPER, sales manager for the Vote Berger Co., La Crosse, Wis., was born in Chicago, November 1, 1887. He is a graduate of the Crane School, 1905, and the Lewis Institute, 1906. Mr. Pieper has always given considerable attention to advertising, the planning of advertising campaigns and the preparation of advertising matter. He is, at this time, managing the American Advertiser, doing a general advertising business, as well as handling sales for the Vote Berger Co. He made a specialty of telephony at school and also took an engineering course with the Western Electric Co., at Chicago, which took him through various departments during two years. He entered the telephone field in 1901, when he operated the night switchboard for the Associated Press. He left Chicago in 1908 to take charge of switchboard construction for the Vote Berger Co., and, in 1911, was advanced to the position of sales manager. Under his supervision, the construction of the company's D. & T. anchor has been improved and its use widely increased. He also opened the Chicago factory which is devoted to the manufacture of the D. & T.

HENRY A. BARNHART is president of the Rochester Telephone Co., of Rochester, Ind. He was born near Twelve Mile, Ind., September 11, 1858, and educated in the common schools, the Amboy Academy and the Wabash Training School. He was elected county surveyor and, a year later, purchased the Rochester Sentinel, which he has published ever since. He was one of the organizers of the Rochester Telephone Co., in 1896, and has been its president since the organization. He was also general manager of the company until his election to Congress in 1908, when he relinquished the active management. He has been re-elected each term and is now entering upon his fourth term in Congress. Mr. Barnhart has always been active in the affairs of both the state and the National Independent telephone associations, having served as president of the latter. He is a director of the Northern Prison, at Michigan City, and a trustee of the state hospital, at Longcliff. He is a member of the Knights of Pythias, the K. O. T. M., the University Club, the Indiana Society, the South Bend Knife and Fork Club and other social organizations.

ALBERT S. HILLHOUSE, plant superintendent of the Cuyahoga Telephone Co., Cleveland, Ohio, was born in Kalamazoo, Mich., November 14, 1867. From 1886 to 1897 he was with the Michigan Bell as troubleman, lineman, wire chief, manager, construction foreman and special agent, covering practically all the upper Michigan peninsula. In 1897 he was right-of-way agent for the Central Union in Illinois, Indiana and Ohio. For the next year and a half he was manager at Washington, C. H., then transferred to Columbus, where he was assistant state foreman of construction until May, 1900, when he went to Champaign and Urbana, Ill., as district manager. In November, 1901, he became secretary and general manager of the Stark County company, at Canton, Ohio, and, in June, 1906, was made assistant general manager of the Cuyahoga, covering the local exchanges of the United States company as well. In April, 1909, he went to Austin, Texas, for the United, rebuilding several properties in that state, returning to the Cuyahoga in the fall, to become plant superintendent. He is a Mason and a member of the Telephone Pioneers of America.

Policies

What Should They Be—Some Interesting Difficulties

By J. C. Kelsey

I was once a happy, carefree young man. Little ever occurred to darken the bright skies.

But some one entered my little Eden and whispered into my ear that I was a great writer.

I "fell" for that serpent-like whisper. So, for nearly four years, you have had the opportunity of reading at least one man's interpretation of current events, which affect the telephone business.

In last week's mail I received seven letters from that many widely situated states, all of them making some suggestion as to how TELEPHONY should be run—every suggestion being based on the local needs of the writer.

The two extremes interested me the most. The first accused me of "lying down"—said I had gone over to the Bell, etc., and that I should run a column which should pour hot shot in the Bell ranks in every issue.

The other extreme was from another sturdy man, Independent, too, who protested earnestly against my unfair attitude toward the Bell interests.

He said that he had made a connecting deal with them and that they had been more than fair—more so than the large Independent company in the same terminus, etc.

The other letters echoed more reasonable demands upon me, and were fairly well divided for and against a vigorous and destructive policy.

In other words, just as I was feeling good for skillfully dodging Scylla, I found my boat scraping against Charybdis!

I am almost tempted to fall back on my old friend Aesop, and relate the fable of the middle-aged man who simultaneously fell in love with an elderly woman and a rather young one.

The young one insisted upon pulling out his gray hairs when he called upon her. The elderly one did not like the black hairs and she, in turn, pulled them out. Finally, both women violently rejected a homely, totally bald man!

So, in trying to please two women, he did not please either one.

In TELEPHONY, if we try to please just 20,000 temperaments and smooth out each one of your perplexities, we might as well throw up the job.

There are as many problems as there are telephones. We can reduce that by allowing each company a problem anyway.

As I said before, I cannot criticize your company, one of the 20,000, any more consistently than you, one of the 20,000, could criticize my policy.

All that TELEPHONY can do is to echo your sentiments, keep an eye on the entire field and point out to you what each peril or problem is.

One week you like what is said, and the next week you get mad and talk about canceling a subscription. What is said is almost every time a reflection of the opinions of others.

If I really wrote what I thought about the telephone business at various times, I would prefer to be in some country where I could not be extradited

I have just as strong beliefs and convictions as any man in the field. But I cannot put mine above 19,999 others! I want you to think of that sometimes when you read something which does not suit you.

I am willing to express the belief, and bank my bread and butter against it, that the National Independent Telephone Association is following and will follow a course which will benefit all of you in the end.

Somewhere I saw a query on this question, as to the effect of its policy on Independent telephony. The first question I want to ask is, what is your mental picture of Independent telephony?

Is it a picture of a man roaring out his belief in his beloved cause? Or the picture of a company with good rates, property in good condition, paying dividends; with money in the bank, good long distance connections, and locally controlled?

As for me, I am sick and tired of the man who bellows out his belief in a mighty cause, and at the same time operates a cheap, tumble-down telephone system, a disgrace to humanity! Such a man is not Independent at all. He is only a lap or two ahead of the sheriff.

If your mental picture of Independent telephony is the same as mine, then any action by our National association would not hurt. If you believe in the uproaring type, then you may expect some discouragement, because the National association is by nature pledged to constructiveness. It is not in its province to destroy, or to quarrel, and waste your money in riotous law suits.

If you really believed that it ought to be a warlike body, your contributions to the war chest belie your beliefs. It costs money to fight, and lots of it, too.

As a matter of fact, 80 per cent. of the open telephone field have gotten over their desires for bloodshed. Their problems are settled, as long as they appreciate their power.

And there is another phase in the evolution of conditions—they may be yours tomorrow. There are a great many estates which own bonds and stocks in Independent properties. As long as the original founders lived, they would not sell nor think of it. But what can you expect a lot of sons and daughters or nephews and nieces when it comes time to divide up the estate?

They want the money at any cost. As it never cost them anything, not even a heartache, they willingly make sacrifices to get the money.

Getting back to the 80 per cent., which are as Independent as the 20 per cent.—they have a right to be heard in TELEPHONY. Majority rule, ordinarily, too. And you must credit the 80 per cent., at least, with a reasonable intelligence.

I don't believe any man of the 80 per cent. and the 20 per cent. has ever forgotten his hatred of early Bell conditions, when the Bell interests regarded him as an outlaw and resorted to savagery to ruin him.

But we must realize that great steps have been taken. The moves once indulged in by the Bell company are more closely analyzed now. There is new blood in that organization which do not believe in the sword, and, of course, there are those left who still dream of monopoly.

But the greatest victory of all is the action taken to put all telephone companies under the Interstate Commerce Commission. It is better for the public, as well as the telephone companies.

First of all, expensive abuses will be eliminated; great expenses will be cut off.

Second, you will have protection against that hydra-headed serpent "discrimination." More of you have suffered from that than anything else. Did you know that railways have more than doubled their dividend accounts since the Interstate Commerce Commission cleaned house for them?

The commission will even increase the dividend account of the Bell, because it will stop the expense of silly war and tend to eliminate that system from places where it now operates at a loss.

If the big company is forced to charge as much as in a non-competitive city, your lower rate will get all the business in your town where you compete. The big company will be glad to withdraw.

With cut rates, it attracted enough local business to encourage it to stay. With full rates, it will lose this and be willing to quit!

There never was a time when the telephone business seemed so well defined and healthy. Those who have fought for 15 years for supremacy will find themselves resting on their ores—their rowing will be confined to taking on new business.

I see little or no need of war. We do have some yet, such as at Johnstown, but I am inclined to believe that this is a mistake.

Every time the Bell company has gone to war, it has been defeated, or has won at awful cost. It surely is tired of it!

A few years ago, when I thought things looked bad, I was willing to take pen in hand and try to arouse you. I tried to tell you that you were in a good business and that you had a strong, economic position. I threw all the venom I had into those columns and appealed to every passion and prejudice.

And I had the most to lose by it, too. I was fearfully misunderstood, and it was no fun to keep quiet in the face of hostile criticism on the part of some self-styled "reel" Independents.

Today I see no more clouds nor danger. I do not fear that a flag of truce conceals batteries. I am half inclined to believe in the good intentions of the Bell company.

I believe economic considerations are forcing it to good intentions, whether there are contrary opinions or not. I have lost my fear of the big Bell company. It can do no harm to any man who watches his own business every minute!

Then I have had another experience. I found that I was pulling chestnuts out of other peoples' fires. This I will never do again. Unless a man is willing to have his name used, I would not give him a letter of a single word!

A few years ago we had some reason to be frightened. The doors of the Bell factory were thrown open. The Bell company, unwilling to give any of its business to Independent factories, started out to divide their business with them. And for a long time I lost faith in Independent telephone men, because they were buying these Bell factory goods.

You know TELEPHONY lives only when you patronize Independent factories. Even TELEPHONY's foundation was threatened!

Today I have my faith fully restored. Bell factory sales no longer threaten anyone. The Independent telephone man found his senses. Today there is no excitement nor worry. Everyone is busy.

It is said that the Bell factory has not had a competitive common battery switchboard on its floors for nearly a year. You learned all about the sacred Bell instrument and have lost your awe.

Today there is no need of worry, war, fear or any distasteful emotion!

I would prefer to never again mention the name of the Bell company—not even in friendliness. We have so much to do to get our own house in order, to improve property and service, and take care of the waiting list.

I look with pride upon the newly-organized Service Association. It uses plowshares, not swords!

The only argument our enemies have against us is bad long distance transmission. The Service Association has but little work to do to put all circuits and apparatus on a "miles per cable" basis. This is the unit of transmission, and it must be used!

Convention politics will not overcome bad service conditions. If you are really Independent, I know I shall find good service in your town and everyone aware of it.

Good service should be the standard of a telephone man's independence.

If I am to go on with the weekly column, my policy will be as always before—a frank and open one. I want to make every telephone man realize the beauties and advantages of his business—to be interested in and proud of his occupation.

As we look back upon the years of our adolescense, we can't help but feel some bitterness. We can appreciate the feeling of the Union soldier at a Confederate reunion who, seeing an old soldier without legs and arms, offered him $10. The Confederate declined it, and asked why he was offered the money. The Union soldier said he was so pleased to find a rebel trimmed up to his satisfaction that he thought $10 was cheap.

Not that the Bell company has lost any legs or arms, but I feel that the decision to put it under the Interstate Commerce Commission is trimming enough for me.

Getting back to the National telephone association and its policies, I want to repeat that I have always felt more or less hostile to some of the controlling influences of the association. That is, I felt and knew that they were hostile to me.

One always feels queer to be shooting at an enemy and not be sure of the friendliness of the man fighting by his side.

But I have never really cared who was friendly or unfriendly, as long as there seemed to be a chance to further the ends of locally-controlled telephony.

I have always asked for someone to go on with this column—to give me a rest as well as you. I am still looking for that volunteer. I am in no danger of running out of material, I only fear your impatience and discontent.

I want each reader to understand clearly that this column is not trying to monopolize all the thoughts and ideas germane to the telephone business. My haste and lack of time for careful preparation will always leave an opportunity of unconsciously offending some one.

One hates to be given credit for a view which is but a reflected one at that.

If my readers detect any sign of "lying down" it is but a sign of natural fatigue. We are still unwashed and unterrified, but we are really entitled to rest at times.

We are all caught up in the wave of evolution which works for the betterment of mankind. Our comments have little effect upon its steady march.

MORAL: Judge not, lest ye be judged.

Practical Telephony for the Practical Exchange Manager

A Series of Articles Relating to the Construction, Maintenance and Operation of a Moderate Size Telephone Exchange, Which Began in the Issue of September 21, Expressed in Everyday Terms, Easily Understood—Principles Easily Applied

By H. R. Van Deventer

The telephone company having been organized and the plant installed, the question of maintenance immediately becomes of great importance.

There is some difficulty in determining just what is "maintenance" and what, "operating expenses." It is often hard to decide what is "maintenance" and "new work," or "plant investment." The small company, however, need not be greatly troubled in endeavoring to segregate these accounts, but may go on the broad rule that: "Everything is maintenance except new work, operators' salaries, fixed charges, and a portion of the manager's salary, if he acts as collector and accountant as well as troubleman."

Maintenance and Plant Charges.

Repairs to outside plant are maintenance charges. Building a new line is plant investment. Replacing a worn-out telephone is maintenance. Troubleman's wages are maintenance expenses. Operators' wages are operating expenses. Rent, insurance and taxes are operating expenses. A new switchboard to replace an old one is maintenance, but an additional section is plant investment.

Money put into "plant" is supposed to be an asset. Money spent for maintenance is gone, but not forgotten, so far as showing an asset is concerned. If it costs $500 to build a line and the first two years, $100 to keep it in repair, the value of the line at the beginning of the third year is something less than $500 and not $600 as a good many men "figger." These people think that if they put $600 into a line, the money stays there. It does not. The rust eats it up; the gentle winds break down the spans of steel; and the blithesome boy with his trusty sling shot, plays hob with the insulators; all of which causes that $600 to fade away. The difference between what is put in and what stays in is "maintenance."

Ever and anon some trusty estimator takes his pen in hand and shows what part of the plant investment should be charged off per year. It cannot be done. If the maintenance account is made as great as it should be and the plan properly maintained, there should be nothing to charge off, as the plant in five years should be just as good as new, as far as a dividend paying machine is concerned. One instance of the futility of "charging off" a fixed percentage of the total investment per year was evidenced by one company which "charged off" for 12 years, and then sold the plant, that theoretically was no longer extant, for $80,000.

Where a certain percentage is charged off for depreciation, it is needless to have a maintenance account. Simply charge off enough to pay for the maintenance and be done with it. Too many small plants have a hundred dollars' worth of bookkeeping to keep track of fifty dollars' worth of accounts.

In a manufacturing establishment, it is sensible to charge off something each year on the machinery, as it becomes obsolete as methods change, and is often scrapped long before it is worn out. A telephone plant, and especially the apparatus, should not be treated this way because a standard has been reached, and it is doubtful if any method will be introduced before the equipment is actually worn out, that will replace it.

The value of a telephone plant is really based upon its earning capacity. The physical value is really so small a part of the actual that a per cent. of it per year, makes but a little difference in the total. For the sake of argument a few millions would duplicate practically any existing plant in any large city, but the capitalization of it is based upon, not the physical property involved, but upon the earning capacity of the property.

Dry cells are always maintenance. They do not last long enough to figure as plant. Perhaps where a thousand or so are required, the initial set may be figured as *plant* and subsequent sets as *maintenance*. Some managers carry these as operating expenses, but they are not really such. The same reasoning applies to switchboard cords and in fact everything that has to do with equipment, is maintenance.

A set of curtains for the operating room is plant. A new ledger is plant as it lasts long enough to be considered as an investment. A lot of toll tickets is operating.

Is a franchise part of the plant? It is, but should not be figured in the plant account, although there are some franchises that have cost their proud possessors considerable. The franchise should be valued separately, and by a competent engineer. There is perhaps no other item so hard to value. Many words have been written and much hair torn out by the roots in a frenzied endeavor to explain the valuation of a franchise. To the small company the franchise is worth just as much as it can get for it. To the big company, its value is like that of the average child to his parents—they wouldn't take millions for him, nor give a plugged nickel for another.

Just as soon as some one tries to value some companies, all the maintenance charges are taken and placed in the plant basket so as to make the investment look very large, and consequently the net revenue looks small. Hence the necessity of some of the wierd accounts heretofore kept by certain companies. The necessity for those convenient places in which to conceal the loot has passed. Because the big companies were so mighty particular to have a number of pockets in which to conceal their loose change is no reason why the small company should do so, especially now when the little fellow has no reason to fear anything worse than chief operators marrying.

Value of Liberal Maintenance Account.

That is a reminder that wedding presents are always chargeable to "plant investment." The prize operator may marry, but for years she will remember her days at "Central." Her good will and the words she will speak are the best investment a small company can have.

Remember that two pockets are really all that need watching. They are the pocket in which is kept the amounts received and that out of which amounts are paid. As long as the former exceeds the latter, all is well if the maintenance of the plant is fully looked after. Sorry is he, who after building, starts to take all the revenue as "profits." Soon there is nothing left but tangled wires and worthless junk. Instead of getting profits earned, such procedure simply eats up the plant. It kills the goose that lays the golden eggs.

Treating the maintenance account liberally is like putting money into the bank—it is all drawn out again with compound interest. Cutting out maintenance is like failing

to pay a note when due—the natural depreciation will foreclose on the plant and separate it from its owners, even as does the "money trust" separate the common people from their coin. Both are just, however. The trust gives its notice and days of grace and the days of grace of the plant are when it begins to give trouble. Right here the interest must be paid; the maintenance must be kept up.

The managers who err in spending too much for maintenance are few—those who spend too little, many. The natural inclination for a man is to make a good showing with as small a maintenance account as possible. Such showings are, however, usually made at the expense of the property which deteriorates in exact proportion as the maintenance falls below normal. The normal maintenance charges for a plant are those that will maintain it at its initial efficiency. This cannot be stated in fixed terms of percentage of the investment, as it is often 5 per cent. in one case or locality and 25 per cent. in another. It is the first factor to be definitely determined together with the operating costs.

The better a plant is maintained, the less the operating cost will be. Poor lines mean poor service. Poor service means a lot of "palaver" between operators and subscribers and recrimination and abuse, which takes time, which costs money. It further means more trips for the collector, as people who get poor service usually do not stand in line at the exchange on the first of the month to pay their bills.

Maintenance is to the telephone plant what food is to the human body. The only difference is one cannot overfeed the plant. Good food in either case costs less than doctoring. Maintenance costs less than actual rebuilding. So maintenance consists of keeping what you have, so that you will have more.

(To be continued.)

Railway Telephony—Practical Points in All Branches

A Regular Department Which Appears Bi-Monthly—Scope Includes Principles of Construction, Testing, Operation and Maintenance—Columns Open for Contributions on Matters of General Interest to Those Engaged in This Branch of Telephony

Selective Signaling Circuits—Methods of Sending Signals—Scientific Adjustments.

By John A. Kick.

The operation of a selector is based upon a number of impulses sent out from the master station at a predetermined speed through a given current which is distributed among the selectors by means of adjustable, variable resistances in the selectors. By means of these resistances the current in the selectors at all stations is the same.

The operation is accomplished by controlling the local circuit of a main line operating relay, that is included in the master signaling equipment at the dispatcher's station. The controlling key or keys are placed in a case on the dispatcher's table. They control the closing and opening of the circuit of the main signaling relay by the rotation of a toothed wheel or other means which cause to contact, a pair of points closing the circuit of the signaling relay.

While there is a predetermined speed at the rate of so many impulses per second, there is a considerable operating margin so that the controlling key or keys may be operated at a slower or a faster speed. In other words the time interval of "closed to line" is controlled by reason of the key closing the local of the main line operating relay in the master selecting equipment for a long or short period as is determined by the time constant of the controlling key or keys. The impulses are of a length depending upon the predetermined speed of the controlling key in the dispatcher's key cabinet and are influenced not only by the speed of this key, but by the adjustment of the main line relay in the master signaling equipment, the travel of its armature, and the tension of its springs.

In addition to the controlling keys in the dispatcher's signaling key case, there is usually a strap key which fills the office of allowing a ring, the length of which is determined by the wishes of the dispatcher, and is accomplished by his closing this key upon the start of the answer back tone. As long as this key is depressed, the battery continues to remain to line, the selector remaining in the operated position, and the bells continue to ring. The operation of the way-station selector is as indicated in this explanation of the series of impulses.

When the selector at the station, which it is desired to ring, receives the proper impulses, the contact is made; the controlling key in the selector key case at the dispatcher's station automatically holds the battery to line for a definite period, causing the selectors to remain in the operated position and the bell to ring until the key has finished its travel, when the selector is automatically released.

The Adjustment of Equipment.

Having explained the cycle of operations, the proper adjustments and maintenance of the equipment will be briefly discussed.

In the main line on the line side of the signal sending relay, it is advisable to place the milliammeter in circuit; close the signaling contact points; and to read the current which should be a total of the equivalent to, say 4 milliamperes per selector. Upon the keys being operated, the mean between the minimum and maximum oscillations of the indicating needle of the meter should be approximately 50 to 55 per cent. of the total current. When these adjustments have been properly arranged, the current passes over the line at the predetermined cycle of constants.

If the adjustable resistances in the way-station selectors are correctly set, the proper current values will be secured at each way-station in the main line signaling bridge. The usual small retardation coils placed in the selector and at the bottom of the selector terminal that connects to the line serve a double purpose inasmuch as they act as impedance to a loss of transmission and choke back lightning discharges.

In the local circuits of the way-station selector, it is well, and in fact, quite advisable to include this meter test. After the meter has been wired in the circuit, close the contact points of the main line operating relay, and read the current through those circuits. Then have the master station send a series of signals and go through the same course of reading the average current as was done at the master station. In this case the mean of the oscillations should be 50 to 55 per cent., the same as at the main station.

It is quite noticeable that from the master station, an observer can check the adjustment of the bell by listening to the tone of the answer back, as may be done by listening in at the station where the test is being made. The indications are more clear by listening in the telephone circuit, than they are by watching the operation of the bell with the naked eye.

If the answer back signals are apparently sticky and continuous, the bell needs pulling up. If it is found that the sig-

nal is very light and irregular, the bell should be lowered in its tension.

By being very careful in making this test with the meter in the local circuit of the selector, the party making the test will notice that, if the closed current reading is, say 220 milliamperes and the current indicated during the time of signaling is on an approximate average of 75 to 80 milliamperes, it will be found the main line relay tension is too high and this should be lowered until the mean between the minimum and maximum indications as the needle oscillates, is approximately 110 to 115 milliamperes, or say 50 to 55 per cent. If the mean current reading is higher than 110 or 115 milliamperes, say perhaps 150 milliamperes, the relay is on too low an adjustment and is in a sticky condition, producing an interval of too long a closed contact. As a result the selector will be found to operate it properly.

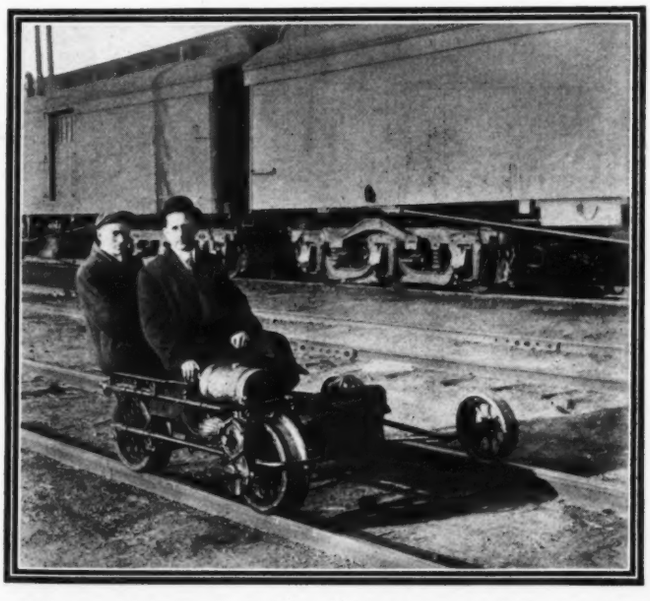
While a rough hand test can be made and a fairly good operation secured by adjusting from observations made with the eye, it is found that a greater working margin will be secured by the use of the milliammeter method. The greater the care in checking the operating intervals and current values, the greater the margin of operation. Statements to the contrary are merely argumentative and not consistent with good operating principles.

It may be alleged that this or that equipment does not require such high class attention but the statement needs qualification. It is clear that an equipment having a large operating margin is not at its highest working efficiency until all of its members are at the maximum operating points, or in other words, until the large operating margin is taken full advantage of by proper timing and securing true values.

By adjusting the equipment of a line in a scientific manner, the installation cost may be slightly increased, but the maintenance saving will more than counter-balance it.

Telephone Inspectors Take Long Trip With Motor Car.

The illustration shows two telephone inspectors, W. H. Safranek in the rear and J. A. Gustafson in the front, and the motor car which they used on a trip from Texarkana,



Railway Telephone Inspectors Who Believe In Motor Car Use.

Texas, to Kansas City. On this trip they inspected all the telephones along the St. Louis & Iron Mountain and the Missouri Pacific Railroads and vow that the motor car method is the most practical way of making railway telephone inspections. The entire trip was made without a single case of trouble with the car.

Alleges Attempt to Operate Without Authority.

The Farmers' Telephone Co., of Bloomville, Ohio, has instituted a suit in the common pleas court at Tiffin, Ohio, seeking to restrain E. J. Hartzel, E. J. Sourwine, August Miller, C. E. Womer and Daniel Benfer from proceeding with the construction, equipment and operation of a telephone exchange or plant in the village of Republic.

The plaintiff alleges that it has operated a telephone system in Republic for more than six years, furnishing adequate service, that the defendants have united under the name of the Republic Mutual Telephone Co., and, without incorporating, are proceeding to establish a telephone exchange in Republic. They propose, it is alleged, to charge subscribers a cash deposit of $25 and a deposit of $10 to cover the cost of an instrument, and expect to charge $10 per annum for service.

It is asserted that they are, in other words, attempting to operate for profit without first applying to the Public Service Commission for authority.

Fixes Rates for Combination Service.

The Central Union Telephone Co. has filed a new rate governing individual party lines which are desired by persons for two places under special arrangement, as at the office and residence of a physician. This is in accordance with the recommendation of the Ohio Public Service Commission in disposing of the recent complaint brought before that body by the Dayton physicians, alleging exorbitant rates.

The new schedule filed deals exclusively with a subscriber desiring service at two locations not reached by the same cable terminal, so that calls from one location may be answered from the other. If both locations are in the same central exchange area the individual line rate for the class of service desired obtains at each station. If the two locations are in different central exchange areas an additional charge will be made for the circuit between the two central offices at the rate of $7.50 annually per quarter of a mile, or fraction thereof.

Exchange Ordered Improved.

By order of the Oklahoma Corporation Commission the Boynton Telephone Exchange, at Boynton, Okla., is given 60 days in which to repair its plant so that it will be serviceable to its patrons. A complaint was registered with the commission some time ago by J. W. Crawford and others, charging that the exchange was in such physical condition that the service was practically worthless.

To Give Municipalities Right to Buy.

A bill has been introduced in the Indiana legislature by Representative VanHorn providing that no municipality shall grant a franchise to a gas, electric light, water or telephone company until the question of buying the utility has been voted upon by the people. Another bill provides that municipalities may own and operate telephone plants and gives authority to sell bonds for the purchase of such plants.

Asks Fee for Charter Amendments.

The Southwestern Telegraph & Telephone Co., according to an opinion just rendered by the attorney general's department, mustpay to the state a fee of $10,800 for filing certain amendments to its charter increasing its stock and its scope. The attorney general sustains the position of the secretary of state in the matter.

Oklahoma Town Agitates Municipal Plant.

The business men of Sayre, Okla., have started an agitation for a municipal telephone exchange, to be placed under the same management as the municipal light plant.

Practical Subjects—Letters and Discussions

Letters From a Retired Lineman to His Nephew.

Dear Ben:—

Your appointment as assistant general foreman reminds me of a story current when President Lincoln appointed a certain general to command the Army of the Potomac. Mr. Lincoln wrote the general a letter in which he conveyed to him the news of the appointment. At the same time he told him plainly of some of his faults as an ideal commander, winding up by saying that in spite of the faults, rather than on account of them, the command was conferred upon him.

So I think that in spite of your erratic disposition, you have been promoted. You probably see why you were kept at the cable reel on the flat boat instead of being sent to New Mexico.

I have been going to tell you many times why my friend Doc. Stuver stayed on this particular rung of the ladder instead of climbing up near the top in his profession. Doc. came here a very young man. He had certain advanced ideas in his head about the prevalent diseases. He struck a fine place to demonstrate his ideas, for Gad's Run was a veritable nest for typhoid fever.

The old doctor there had accumulated a lot of experience and bills in that locality and readily turned the district over to young Stuver. It took him the best part of two years to convince the farmers down that way that ten foot wells furnished only impure, germ laden, drinking water. He finally began to get the money instead of the undertaker and Gad's Run became as healthy a locality as any other part of the country.

About that time, Doc. was sent for to take a position in some hospital back East, and announced he was going at a certain time. The people there did not feel like letting him go and put their heads together to keep him. First they brought measles into the community; then whooping cough; chicken pox followed. One old lady sent for a nephew in Iowa who was suffering from a carbuncle and was very much disappointed when she found it wasn't contageous. Well, they kept Doc. pretty busy with everything from the itch to scarlet fever, and at a very small sacrifice of life kept him a year or more.

Even at that he would have gone in the end, if Tom Starling hadn't brought his niece here from Cincinnati to help take care of his four children while his wife was sick with scarlet fever. Somehow Doc. couldn't run away from Tom's niece and in about two years they were married. She did not approve of his going East, so he stayed here. About all the world has ever heard of him is through his articles in medical journals. He's a bigger man in his profession than anyone here realizes. After all, perhaps, he has done as well here as anywhere, and in the long run is quite as happy as he would have been elsewhere.

Your frequent references to going back to Wappleton makes me think that, perhaps, like Doc., you might conclude to stick there indefinitely. You've passed through many more likelier places than Wappleton, so I imagine there is something to attract you which doesn't show on the map or in any prospective pamphlet. Am I right?

Doc. finally got the fellows into line in our telephone project and I am pretty busy now overseeing the construction work. Was lucky in getting cedar poles and am putting up second hand six-pin arms. The main point is, we have the highway rights from the county clear to the line of the country seat; legal right of way assignments on all private property even to the loops leading back to the subscriber's houses. In other words, we've got something tangible.

The county seat proper want to join onto our line and have been after us from the day the first pole was set. We have had some pretty good offers for our stock and I think eventually will sell at a good profit; that is, if the county seat company can raise the cash.

We have one little river crossing, 480 feet. We put in No. 6 iron there and had a great time getting it across the stream. The others undertook to do it when I wasn't there. Somehow they couldn't work it by setting the reels on the bank and carrying the wire across in a boat. It did not occur to them to take a rope across first. Well, anyway, they loaded the two reels on the boat and with one man tending reels and two at the oars, started across.

The current is pretty strong in one part of the stream and carried the boat out of its coarse. One reel got tangled and while looking after it, the man lost control of the other, which began to spin under the strain. Well you know what No. 6 iron will do when let loose from the original coil. Those fellows had the time of their lives. They landed broadside against the bank down stream aways, bound hand and foot in a tangle of wire loops, drawn tight by the drift of the boat. One fellow had a loop round his neck and was pretty well pushed for fresh air when they got him untangled. I got there in time to see the finish.

After that we anchored a scow in mid-stream, hung a couple of pulleys for riders, took a rope across and pulled the wires from bank to bank without any trouble.

I guess I'll never get old enough not to do foolish things once in a while. The other day I went up the line a few miles and replaced a 30-ft. corner pole all by myself. I would have taken a man with me but couldn't get one that day, and the wire chief was anxious to have the job done as the old pole was eaten almost in two by woodpeckers. I was lucky and nothing serious happened, but a dozen things might have happened, and, if the corner had gotten away from me, I guess my stock would have been pretty low. The wire chief told me as much when I reported to him that the job was done, and the expense. Said he would rather have sent a man all the way out from town to help me than have run any such risk.

Maybe your new job will give you a chance to drop around this way. Have some wood ready to split if you need exercise.

The kiddies have the mumps just now. UNCLE DICK.

A Preventative of Grimy Hands.

As an electrician I have been troubled by what seems almost an impossibility to get my hands clean after working on some makes of wires, around motors that have been used and are oily, and in various other places, says C. W. Goddard, in the Electrical Review and Western Electrician. The grime seems to be driven right into the skin, and scrubbing does not entirely remove it. Some time ago I saw a recipe, but only within a few weeks have I tried it. It is as follows:

Mix four ounces of alcohol (grain alcohol), three ounces of glycerin and three ounces of water. Rub some of this solution into the hands in the morning. It quickly dries in, and then no matter how dirty one's hands get, ordinary washing with soap and water brings off all the dirt. The theory, I believe, is that the pores of the skin, and around the nails, are filled with this mixture and the oil and dirt do not penetrate. At any rate, by using this solution on the hands, one can go to his meals, even at noon when time to wash is limited, with hands as clean and white as a woman's. It would be good for machinists, blacksmiths, etc., I believe, as well as electricians.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities, and Actions of City Councils Bearing Upon Franchises, Rates and Service

Commerce Committee Would Strengthen Anti-trust Laws.

The supreme court's so-called modification of the Sherman anti-trust law to invoke "the rule of reason" in decisions upon restraints of trade is attacked in vigorous terms in a report just presented to the senate by the interstate commerce committee, says a Washington dispatch.

The report points out the dangers of "uncontrolled and unguided judicial discretion" and makes emphatic demand for amendments to the Sherman law to remove from the courts the power to determine what are "reasonable" restraints of trade.

The report is the result of the committee's long investigation into the operation of the anti-trust law.

The committee recommends new laws to define exactly what combinations are unlawful, so that both the business interests and the courts will have a standard upon which to proceed.

It recommends a federal interstate corporation commission, with power to supervise corporations, pass on and approve combinations and agreements, and take over the work of dissolving illegal corporations, such as the Standard Oil Co. or the American Tobacco Co.

SAYS COURT NOW MAKES LAWS.

Commenting upon the decision of the supreme court in the Standard Oil case, in which the "rule of reason" was called in, the report, written by Senator Cummins, says in part:

"The committee has full confidence in the integrity, intelligence, and patriotism of the Supreme Court of the United States, but it is unwilling to repose in that court, or any other court, the vast and undefined powers which it must exercise in the administration of the statutes under the rule which it has promulgated. It substitutes the court in the place of congress, for whenever the rule is invoked the court does not administer the law, but makes the law.

It is inconceivable that in a country that is governed by a written constitution and statute law the courts can be permitted to test each restraint of trade by the economic standard which the individual members of the court may happen to approve.

As the anti-trust statute is now construed, it is impossible for any association of men, however diligent they may be in seeking advice and however willing to follow it, to know whether what they are doing or what they are about to do will be ultimately found by the supreme court to be a due or an undue restraint of trade."

No specific legislation is recommended by the committee, but it urges congress to devise laws as quickly as possible which shall "specifically prescribe certain conditions upon which persons and corporations shall be permitted to engage in commerce."

"Public Convenience and Necessity."

That duplication of telephone companies in Wisconsin may not be permitted without a certificate of public convenience and necessity for a community where one company is already maintaining an exchange is held in an opinion by Attorney General Owen this week.

The point was raised in the case of the Bergen Telephone Co. and the Clinton Telephone Co., of Clinton, Wis. The state Railroad Commission held that the word "exchange" as used in the statute applied to the whole telephone system, and that an existing company out of the city where an exchange is operated can only connect with persons in the city by physical connection through the existing city exchange.

Seattle Investigation to Cover Coast.

The investigation of the telephone situation by a federal grand jury in Seattle, Wash., will be absolutely impartial and will cover the entire coast. The only desire of the government will be to arrive at the exact truth concerning the numerous mergers and alleged violations of the Sherman antitrust law.

Such was the statement made by United States Attorney Beverly W. Coiner, following a prolonged conference between himself, Special Assistant John McCourt, Special Agent Charles Pray, of the Department of Justice, and C. J. Pettys, assistant secretary and treasurer of the Pacific Telephone & Telegraph Co., of San Francisco.

Oppose Transfer of New York City Supervision.

Considerable opposition has developed to the bill of Senator John C. Fitzgerald, of Manhattan, who would put the supervision of wire companies in New York City under the jurisdiction of the First District Public Service Commission, which was organized especially to look after transportation affairs in Greater New York.

T. P. Sylvan, of the New York Telephone Co.; R. H. Overbaugh, of the Postal Telegraph Co.; Attorney Howard Hendrickson, of the United Message Co., of Albany; and Ledyard P. Hale, counsel for the Public Service Commission, Second District, appeared in opposition at the hearing held before the senate judiciary committee.

Apply Some Reduction to Residence Stations.

Professor Edward W. Bemis, Chicago's public utility expert, agrees with members of the council committee that it might be desirable, in fixing new telephone rates, to apply more of the annual $421,000 proposed reduction to residence telephones than his report recommended.

He was instructed to make another estimate, with this in mind. His new figures will be directed toward a reduction of the rates for two-party and four-party nickel residence telephones.

Refuses General Order Raising Rural Rates.

The Oklahoma Corporation Commission has refused to entertain an application for a general order raising the rates for switching rural telephone lines through exchanges of companies in the cities and towns of the state. It was claimed that the present charge, 25 cents, is inadequate and that the switching charge should be made from 35 to 50 cents. The commission announces, however, that it will consider individual complaints which may be filed by any particular exchange.

Insists Upon Accurate Trouble Records.

The Wausau Telephone Co., of Wausau, Wis., is directed by a decision of the Wisconsin Railroad Commission to install a better system of handling its trouble complaints. Last July Herbert A. Hoffman and 25 others complained to the commission that the service of the company was inadequate and that the company had put its subscribers to trouble and inconvenience by shutting off its patrons without notice, even when all bills for service were paid.

"It is the duty of the utility to furnish a reasonably adequate telephone service to all of its subscribers and to do everything that may be reasonably required to furnish that service at all times and without unnecessary delay," say the commission's decision. "This case is no exception to the general rule. With regard to the second portion of the complaint, viz., that subscribers were cut off without notice even after their bills had been paid, it need only be said that if this condition exists, it constitutes inexcusable negligence on the part of the telephone utility."

The commission orders it to make such changes as may be necessary to handle trouble reports promptly and requires it to keep an accurate record of all trouble reported and detected and of the time when such trouble is cleared. The commission did not pass upon the subject of rates.

Denies Interstate Commission's Jurisdiction.

Denying the jurisdiction of the Interstate Commerce Commission over its Washington telephone contracts, the Chesapeake & Potomac (Bell) Telephone Co. has made answer to the complaint filed with the commission by the Stone Mercantile Agency, alleging that the telephone company rates were unreasonable, unjust, and discriminatory. The answer states in part:

"The respondent, the Chesapeake & Potomac Telephone Co., says this honorable commission has no jurisdiction over the subject matter of the petition, herein, as the rates set forth therein are for the transmission of telephone messages wholly within the District of Columbia and are not subject to the provisions of the act to regulate commerce."

The telephone company denies that the rates charged the Stone corporation are excessive, unreasonable, or unjust, or in violation of the interstate commerce act. In the complaint filed by Stone's Mercantile Agency, it is alleged that the service extends into Maryland.

To Test Kentucky Interconnection Law.

A test of the act of 1912, requiring physical connection between competing telephone systems may result from a complaint filed with the Kentucky Railroad Commission by the Campbellsville Home Telephone Co., to the effect that the Cumberland Telephone & Telegraph Co. has refused to make physical connection with its line at that point.

In the correspondence that passed between the two companies the reason given for the refusal is that the Columbia Home Telephone Co., a competing line, has objected to the Campbellsville company making such connection, and the Cumberland company declares it would be unpleasant for two competing companies to connect at the same place and attempt to use the Cumberland lines jointly.

This is the first request of the kind that has been brought to the attention of the commission, and litigation is expected.

Would Carry Case to Federal Courts.

Claiming that the ousting of the Iowa Telephone Co. from the streets of Des Moines, Iowa, would be confiscation of property without due process of law, the telephone company has filed an amendment in the district court in the case of W. T. Shaver vs. Iowa Telephone Co., in which the constitutional question is raised. This is said to be for the purpose of enabling the telephone company to transfer the case to the federal courts, provided the state courts find that the company is occupying the streets of Des Moines without a franchise and ordering the company to withdraw from the streets.

In this case an effort is being made to oust the telephone company from the streets of Des Moines. It was filed in the district court eight years ago, but the hearing of it was delayed until the supreme court of Iowa should rule on similar cases.

The supreme court has ruled that a telephone company has no authority to occupy the streets of a city without a franchise. This was expected to make plain sailing for the Des Moines case through the Iowa courts, but the Iowa Telephone Co. is now attempting to raise the question which, it is said, may permit the transferral of the case to the federal court. This would eventually take the case to the United States supreme court.

Emergency Merger Legislation in Oregon.

In order to give the attorney general more authority in blocking the alleged attempt of the Pacific States Telephone & Telegraph Co., to merge the Northwestern Long Distance Co. on a foreclosure suit, senate bill 156 will probably be rushed through the legislature with an emergency clause attached.

This bill provides that no public utility corporation can acquire or merge with another public utility corporation without the consent of the state Railroad Commission. The act is drafted to apply to any merger of which any part takes place after the bill becomes a law.

Ohio Commission Extends Time for Betterments.

The Ohio Public Service Commission has refused to extend the time within which the Clinton Telephone Co. is to install a new switchboard, from March 1, 1913, to March 1, 1915, in accordance with a previous order of the commission. It does say, however, that it will not hold the company to the original date set, and will enter a ruling subsequently fixing the time, after further investigation.

Lima Company to Buy Bell Plant.

The Ohio Public Service Commission has given formal consent to the purchase by the Lima Telephone & Telegraph Co., of Lima, Ohio, of the property in that city owned by the Central Union Telephone Co. The transaction involves an outlay of $205,000. Connection is to be made between the lines of the two companies.

Rulings of the Ohio Commission.

The Ohio Public Service Commission has granted the Winona Central Telephone Co. permission to purchase, for the sum of $3,100, the property of the Hephner Hollow Telephone Co. An issue of $1,900 of extra stock of the Winona Central company is also authorized, the proceeds to be applied to this purchase.

Under another order, the Union County Telephone Co. is authorized to sell to the Union County Farmers Telephone Co. certain property at York, Ohio., for $3,398.75; and the Farmers company may sell to the Union property at Raymond, for $3,788.14. Connection between the two systems is also permitted.

Consent has been given for the renewal of an interconnecting arrangement between the Central Union Telephone Co. and the telephone system of the Gibsonburg Electric Light Co. A similar agreement may be continued between the Central Union and the Seneca Telephone Co., of Gibsonburg.

As to Investigation of New York Bell.

An answer to a resolution, passed by the New York assembly, requesting the Public Service Commission to make an examination of the business and assets of the New York Telephone Co. in the state has been returned by the commission. The answer is that with the force at command of the commission it would take 28 years to complete the investigation. With the force increased to 100 additional inspectors and engineers the investigation could be completed in one year at a cost of $270,000. The New York Telephone Co., the commission says, has property in the state valued at over $100,000,000, and 364 exchanges in 49 counties.

Specifications and Tests on Telephone and Telegraph Wire

The Third of a Series of Articles Dealing with the Essential Properties of Wire—The Use of Copper-Steel Wire and Points to Be Considered by Prospective Users—Manufacturing Difficulties

By Hugh T. Wreaks and E. J. Jones
Wire Inspection Bureau

Copper-Steel Wire.

The subject of copper-steel wire is of interest to the telephone companies and is one that needs to be carefully studied. This article is intended to touch on several points which should be considered by contemplative users.

Copper-steel is relatively a new product commercially, and must be disassociated from the old copper covered steel, or what was known as "bi-metallic." That was simply a copper tube shrunken on to a steel center, whereas copper-steel consists of a steel core around and on to which a copper covering has been permanently welded through an intervening copper-iron alloy. The process of manufacture is a rather costly and delicate one, but when rightly made the three component metals are absolutely inseparable except by attacking and dissolving individually with certain acids.

B. & S. Gauge Number	Weight per Mile		Approximate Elastic Limit		Approximate Breaking Weight		Ave. Resistance Int. Ohms per Mile at 75° F.						
							Copper Clad						
							30% Grade		40% Grade		47% Grade		Copper
	Copper Clad	Copper	Copper Clad	Copper	Copper Clad	Copper	Max. 27%	Ave. 30%	Max. 35%	Ave. 40%	Max. 44%	Ave. 47%	
0000	3140	3378.	5000	2770	10000.	8310.	1.00	.90	.77	.67	.61	.57	.27
000	2490	2678.	4150.	2190.	8300	6580.	1.26	1.13	.97	.85	.77	.72	.34
	1975	2124.	3420.	1740.	6850.	5226	1.59	1.43	1.23	1.07	.98	.91	.43
0	1570.	1685.	2850.	1520.	5700.	4558.	2.	1.80	1.54	1.35	1.23	1.15	.54
1	1240.	1336.	2400.	1250.	4800.	3746.	2.55	2.30	1.97	1.72	1.57	1.46	.69
2	985.	1059.	2000.	1040.	4000.	3127	3.19	2.87	2.46	2.15	1.95	1.83	.86
3	780.	840.1	1600.	830.	3200.	2480.	4.04	3.63	3.11	2.72	2.48	2.32	1.09
4	620.	666.3	1300.	650.	2600.	1967.	5.07	4.57	3.91	3.43	3.11	2.92	1.37
5	491.	528.2	1100.	520.	2200.	1559.	6.40	5.77	4.94	4.33	3.93	3.67	1.73
6	390.	419.0	900.	410.	1800.	1237.	8.07	7.26	6.23	5.45	4.95	4.63	2.18
7	309.	332.4	720.	330.	1450.	980.	10.22	9.20	7.88	6.90	6.27	5.86	2.76
8	245.	263.6	600.	260.	1200.	778.	12.92	11.63	9.97	8.73	7.93	7.42	3.49
9	194.	208.9	480.	210.	975.	617.	16.26	14.63	12.54	10.97	9.98	9.35	4.39
10	154.	165.8	400.	160.	800.	489.	20.33	18.30	15.68	13.72	12.48	11.69	5.49
11	122.	131.3	325.	130.	650.	388.	25.55	23.	19.71	17.25	15.68	14.68	6.90
12	97.	104.2	250.	100.	510.	307.	32.22	29.	24.85	21.75	19.77	18.53	8.70
13	77.	82.7	200	80.	410.	244.	40.78	36.70	31.45	27.57	25.02	23.45	11.01
14	61.	65.5	165.	60.	330.	193.	51.63	46.47	39.83	34.85	31.68	29.63	13.94

Table No. 1. Comparative Characteristics, Copper and Copper Clad Wire.

The manufactured product, combining as it does most of the characteristics of both the copper and steel of which it is composed, and having through this union added certain of its own, makes a distinctly advantageous material for some classes of work, where certain conditions must be met with and overcome. It is especially desirable for a region where severe sleet storms are frequent and where long spans are necessary. The tensile strength and elastic limit are approximately 50 per cent. or more higher than that of hard drawn copper. Where strength and elasticity are large factors, the possibility of using a smaller conductor adds to this both by the reduction in weight of metal which the line is forced to carry as well as by reducing the amount of surface area presented for the clinging of external weighty matter.

Another advantage over copper lies in the fact that this material is more ductile, has more elasticity, will stand more elongation, and that the surface skin of the copper does not play such an important part in respect to these as is the case in hard drawn copper, inasmuch as the steel core is mainly depended upon for the strength, elasticity and flexibility of copper-steel. This makes the danger of material damaged in handling much less. Still another point which is of importance is that due to the lower specific gravity of this material, approximately 7 per cent. more length being contained in the same weight as figured against copper.

However, in considering the use of this material the necessary current carrying capacity must be carefully studied and all comparisons carefully figured against whatever material it is intended to replace. The following tables should be of material assistance in making proper comparisons.

The first table shown is from the Duplex Metals Company's handbook, and is apparently a fair comparison of its product with standard hard drawn copper. It will be noted that owing to the difference in specific gravities there is a saving of about 7 per cent. in copper clad over copper wire of the same size and length. Under each grade of copper clad two columns of resistances are given. The first shows the maximum allowable resistance of any coil, and the second the average resistance of the material furnished in that grade. For practical purposes and line calculations, the average resistance is the figure that should be used. The maximum resistance is simply given for guidance in inspecting the material.

The second table has been compiled from standard specifications for the various metals covered.

As these are mixed gauges the sizes given are only standard for copper and copper clad in B&S gages (galvanized steel in BWG).

By noting characteristics, as given, and taking into consideration the service requirements and value of tensile strength, elasticity, resistance, and weight per mile compared with probable life and value of wire in case of change of lines, and also noting price in pounds and pounds per mile, it is possible to figure quite closely the best material for any given service.

Another condition which must be recognized and contended with, especially in telephone work, and which applies more or less to all metals, other than copper, mentioned in tables, is the seeming impracticability of securing an absolute standard resistance which will not vary in different lengths. It will be noticed that this condition is taken into account by the Duplex Metals Co. in its table by allowing copper clad a variation in conductivity for each "class." This must particularly be considered in small sizes of wire for twisted pair work, in order to properly balance these lines.

One large user of copper-steel has met this by subdividing each class into three individual groups, allowing certain variation of resistance for each and pairing wires of the same group. In order to do this they take resistance readings on samples from both ends of each coil and afterwards sorting and marking the coils. This apparently offers a satisfactory solution of the problem.

The various methods employed in making of copper-steel wire, aside from the coating of the billet, are very similar to those used in the manufacture of all other wires. The billet is rolled while hot down to a rod, or what is designated a wire bar, of required diameter, which is according to the size of the wire into which it is to be drawn. Usually a $\frac{3}{8}$-in. rod. It is then drawn cold to the required size, mainly in the same manner as described previously regarding hard drawn copper.

The very nature of the material and the process of manufacture, treating as it does two metals of widely different natures and hardnesses, as one offers numerous opportunities for the development of imperfection, unless great care is exercised in all of its various treatments. The purchaser

should have thorough inspection and tests made by someone who thoroughly understands the material and its possible defects, and who is familiar with the instruments used and the method of making the various tests necessary to ascertain that the wire purchased is as nearly perfect as is possible in general practice.

The perfection of the weld is apparently a far more important factor in the "life" of the wire than is generally understood, even though the copper sheath remain unbroken.

Bi-metallic wire has demonstrated that where a weld has not been perfect, a corrosive action of some nature frequently takes place and both copper and steel are destroyed. This is due probably to an electrolytic action set up through the difference in potential between the copper and the steel, where the contact is not perfect, somewhat in the same manner as obtained by various other methods. It shows also that to account for the magnetic properties of ferromagnetic substances, there must exist between the molecular magnets of those substances an internal magnetic field whose magnetic force is of a magnitude of not less than 6,000,000 units.

Copies of Bulletin 62 may be obtained upon application to W. F. M. Goss, Director of the Engineering Experiment Station University of Illinois, Urbana, Illinois.

Many Delayed Installations in Japan.

The number of applications for the installation of new telephones in Japan now numbers 127,876, says a United States consul in that country.. It is estimated that by the year 1923 the number of applications for the installation of telephones will reach nearly 400,000, and that, to complete the installation of these instruments by the time stated, an expenditure of $5,000,000 will be required. Of the amount required less than one-half is available.

Ordinarily, under existing conditions, several years elapse before an application for telephone service for other than government purposes can be complied with, the period varying from five to eight years. As a result when a subscriber desires to dispense with his telephone a premium is paid by an applicant for telephone connection.

Physical properties.	Aluminum.	Hard drawn copper	47% Copper Clad.	B. B. galv. steel.
Approx. brk. wt. per sq. in.	30,000 lbs.	60,000 lbs.	100,000 lbs.	51,000 lbs.
Approx. elastic limit sq. in.	14,000 lbs.	30,000 lbs.	50,000 lbs.	25,000 lbs.
Resistance, ohms. per mile at 68 deg. Fahr.	88,200 cir. mils	55,700 cir. mils	122,519 cir. mils	390,076 cir. mils
Wt. in lbs. per cu. in.	0.0967	0.320	0.300	0.281
Wt. in lbs. per mile	6,087 x area sq. in.	20,275 x area sq. in.	19,008 x area sq. in.	17,800 x area sq. in.

	No. 17 B&S	No. 14 B&S	No. 12 B&S	No. 9 B&S	No. 16 BWG	No. 14 BWG	No. 12 BWG	No. 10 BWG
Ohms Per Mile.								
Copper clad	60.5	29.8	18.7	9.3	29.0	17.7	10.3	6.9
Copper.	27.0	13.5	8.5	4.2	13.1	8.0	4.8	3.2
Aluminum.	43.5	21.7	13.5	6.7	21.0	12.8	7.4	5.0
BB galv. steel	109.5	95.0	60.0	30.0	92.0	56.6	31.9	22.0
Breaking Weight.								
Copper clad.	165.0	330.0	510.0	975.0	340.0	545.0	885.0	1310.0
Copper.	96.5	193.0	308.0	620.0	200.0	341.0	560.0	845.0
Aluminum.	48.2	97.0	155.0	310.0	99.0	162.0	280.0	420.0
BB galv. steel	81.0	164.0	262.0	530.0	168.0	275.0	474.0	719.0
Elastic Limit.								
Copper clad.	79.5	160.0	257.0	519.0	166.0	270.0	466.0	705.0
Copper.	47.7	96.0	156.0	309.0	99.0	162.0	279.0	423.0
Aluminum.	22.0	44.0	72.0	145.0	46.0	75.0	130.0	197.0
BB galv. steel	39.0	80.0	128.0	259.0	83.0	135.0	233.0	352.0
Weight Per Mile.								
Copper clad.	30.0	61.0	97.0	194.0	62.7	102.6	176.7	267.0
Copper.	32.3	65.0	104.5	210.0	66.8	109.4	188.0	285.0
Aluminum.	9.7	19.4	31.3	63.2	20.0	32.8	56.6	85.0
BB galv. steel	28.3	56.9	91.6	184.7	58.7	96.0	165.0	250.0

Table No. 2. Properties of Various Sizes and Kinds of Wire.

occurs on cable sheaths where not properly bonded. The writer has observed unwelded wire after service, in which such trouble has developed, and noticed that in places where the surface was still unbroken, the copper was raised in form of small blisters, showing evidence of the action underneath.

There are several ways of determining a perfect weld. When wire is broken by torsion or by repeated bending, or when heated to a dull red and hammered or quenched with ice water, the steel and copper should show no evidence of separation. *(To be continued.)*

The Electron Theory of Magnetism.

"The Electron Theory of Magnetism," by Dr. E. H. Williams, has just been issued as Bulletin 62 of the Engineering Experiment Station of the University of Illinois.

In the study of physical phenomena various theories have been advanced, from time to time, as to the nature of magnetism. The most interesting and important of these is the electron theory. The bulletin traces the experimental advance leading to the development of this theory in its present status, and points out phenomena which the theory in its present form fails satisfactorily to explain. It shows, for example, that fundamental qualities in nature, such as the mass of a hydrogen atom, when determined by methods based on the electron theory from experimental data obtained with iron, nickel, and cobalt, check very closely with accepted results

Pacific Coast Convention of A. I. E. E.

At the request of the Institute members in Vancouver and vicinity, the board of directors has authorized the holding of the annual Pacific Coast convention of the A. I. E. E. at Vancouver, British Columbia, on September 9, 10 and 11, 1913. The Vancouver section has been working for some time in preparation for this convention, and has already arranged for a number of papers. Plans are maturing for interesting trips to some of the large hydroelectric installations in the vicinity of Vancouver. Arrangements are being made for special rates over all railroads, and as this will afford to the engineering fraternity an excellent opportunity for visiting this region so interesting from the point of view of hydroelectric development, it is expected that a large attendance from the East, as well as from the West, will be assured.

From Factory and Salesroom

Conventions: Iowa Assn., Des Moines, March 11, 12, 13 ; North Dakota Assn., Valley City, March 11, 12; Florida Assn., Tampa, March 13, 14

"A Hardy Line—A Hardy Agent," Says Ericsson.

F. S. Hardy, of the ditto firm, came to the birthplace of Ericsson telephones just to see how they were made. He couldn't believe they were really turned out in U. S. A. Like the small boy seeing his first elephant, he was inclined to say, "There ain't no such animal." However, being from Boston, he simply couldn't so subvert the English language. You know, they're dreadfully correct in Boston—but that's another story. Anyhow Mr. Hardy is perfectly correct when he says he has no telephone competition in the New England states, because Ericsson quality has no competitors.

And speaking of New England—maybe that explains his name, for one must be Hardy to grub a fortune from stingy nature in those states. Still, of course, an Ericsson agency makes it easier. And Mr. Hardy's kindly and courteous nature must have made him lots of friends up there—so it's doubly easy.

The Simplex Wiring Computer.

Electrical engineers and wiremen, it is said, will appreciate the wiring computer which the Simplex Wire & Cable Co. will send on request.

The computer is mounted on stiff thick celluloid of a convenient pocket size. It consists of a circular slide rule particularly adapted for wiring calculations.

By a single setting of the computer the following results may be obtained: The size B. & S. gage of a wire is readily determined by setting the disc to correspond to a given distance of distribution for a desired voltage drop and the current which the wire is to carry; or given the size B. & S. gage, the current to be carried, and the distance transmission, the resulting voltage drop may be read directly upon the computer. In like manner, the current may be found at one setting for a desired voltage drop with a definite sized wire and distance of transmission. Finally, the distance to correspond to specific conditions of voltage drop, the current and size of wire may be found by a single setting of the disc.

The setting of the disc is very simple and directions for attaining these four different results are given explicitly at the foot of the card. Much laborious figuring is avoided by its use. On the reverse side of the pocket card are handy tables of wiring data and table of decimal equivalents of fractions of an inch.

Anyone who desires one of these wiring computers may receive one by communicating with the Simplex Wire & Cable Co., 201 Devonshire street, Boston.

Hails Ironite as the Best in the South.

One of the big users of Ironite, in the South, wrote the Paragon Sellers Co., of Chicago, the other day, a very interesting letter. This concern, a large operating telephone company, had been using other wire to a large extent, but is now using Ironite exclusively. It wrote:

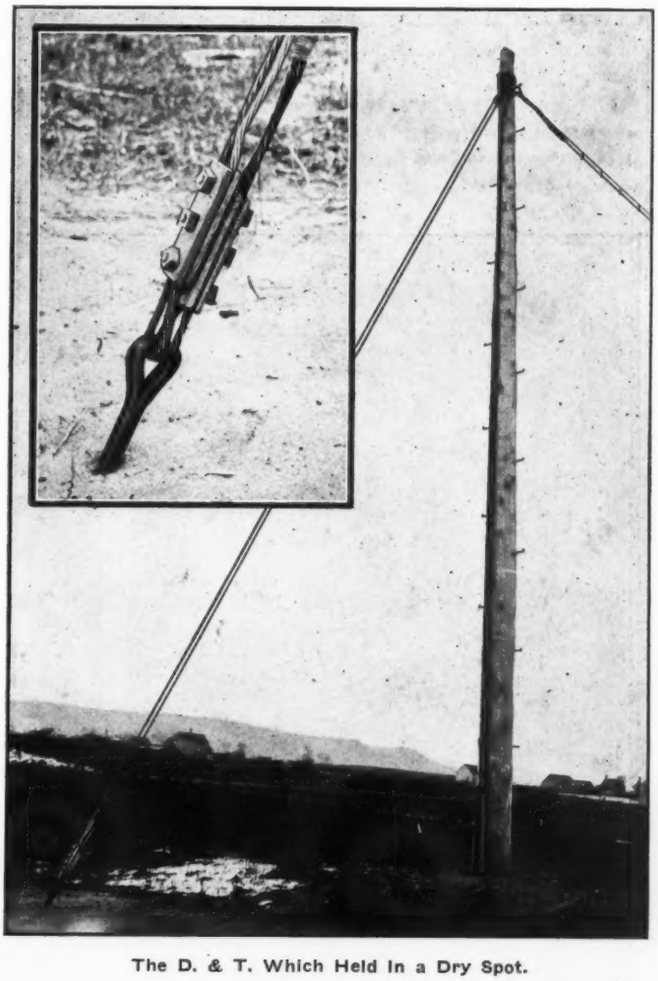
"For your information, we are using Ironite exclusively in our system and find it superior in the southern climate to any other drop wire, as we have found it holds up much better during the hot weather and the insulation does not soften and break down.

We are operating 900 stations in one exchange and have a trouble record of less than eight cases per month, so you can see that we are certainly receiving most gratifying results by the use of Ironite as distribution wire."

This is an endorsement which, entirely unsolicited, is, none the less, very acceptable. The Paragon Sellers Co., states that its sales of Ironite are increasing steadily, and that it looks forward to a big year in 1913.

D. & T. Anchor in Sandy Soil.

The accompanying illustration, taken from a photograph, shows the use of a No. 3 Drive and Twist anchor in guying a dead ended 25 pair cable. The soil is very light and sandy and it was found extremely hard to use any form of anchor that required digging in this locality, for the soil,



The D. & T. Which Held In a Dry Spot.

when once disturbed, is practically as bad as quicksand. A 3/8 in. high tension messenger was used for hanging the cable and two 3/8 in. messengers were brought down to the anchor.

The Vote Berger Co., La Crosse, Wis., states that the installation was made about 10 months ago and that there has not been an inch of creepage since that time. The installation has been very carefully watched by a number of engineers who are anxious to know the permanency of the hold.

New and Improved Telephone Train Dispatching Apparatus.

The Automatic Electric Co., Chicago, has for the past two years been perfecting a selective telephone system for train dispatching, and it now announces that it is ready to offer it fully guaranteed. It is now said, after thorough testing, to be perfect so far as any machine can be.

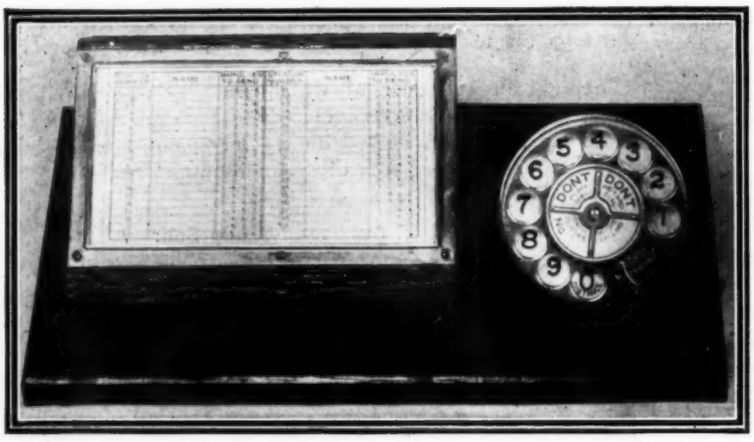


Fig. 1. The Wire Chief's Calling Device.

The system has several novel and improved features which doubtless will appeal to the railway telephone men. It is claimed that the time required for a call is reduced to about 4½ seconds and that the number of stations per line is practically limitless. The current required for its operation is said to be extremely small. This means the voltage required on the line is comparatively low and the line leak is, therefore quite naturally reduced.

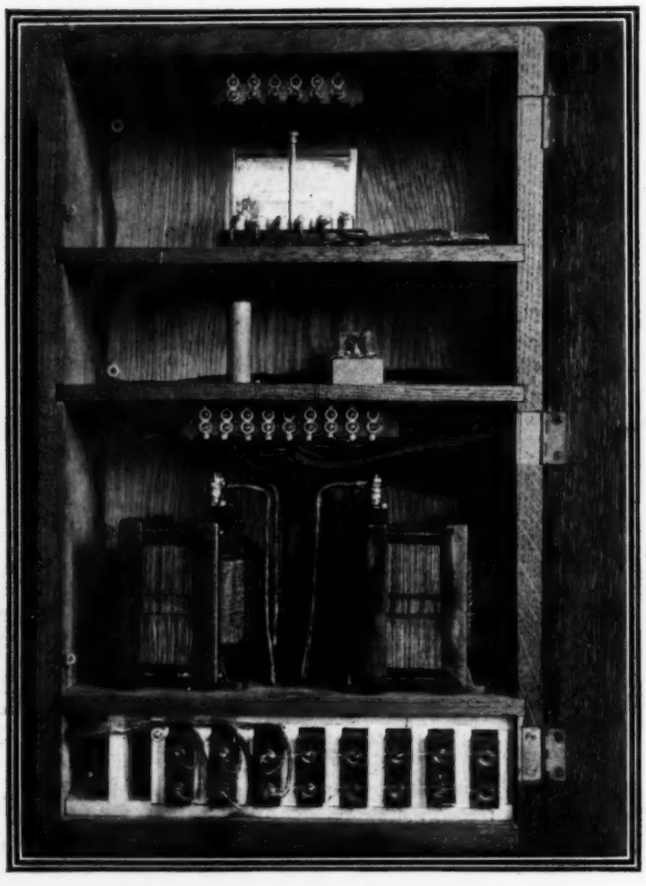


Fig. 2. Interior of Dispatcher's Station Set.

The selector is simple and durable in construction, having but one adjustable feature. It is equipped with a wiper contact, which the company claims cannot corrode or become blackened. The selector can be easily set for any combination desired and operates on a current of from 4 milliamperes up. The mechanism is placed in dust proof case which is equipped with hold-fast binding posts, arranged to take either cord clips, cord tips or wires and can be sealed if desired to prevent inquisitive or malicious meddling. In operation its action is said to be positive.

The selector may be wound to operate directly from the main line circuit or from the local contact of the relay. When wound for the former service, it has a resistance of 4,000 ohms and for the latter, 14 ohms. It operates the bell on open circuit, and is, therefore, adaptable to simplex work. It is also claimed to be an economical proposition from a battery consumption standpoint.

The relay used in the line circuit, wound to 4,000 ohms, is very efficient in operation. It operates on from one to ten milliamperes on one adjustment and has both a core and tension adjustment.

The calling device is all in one piece of equipment and is said to be much less expensive as to first cost and maintenance than other types.

An auxiliary or wire chief's calling device, shown in Fig. 1, is provided with each equipment for use in testing, and in case of re-adjustment being necessary on the dispatcher's dial. The equipment is all arranged very compactly as may be seen by referring to Figs. 2 and 3. It is so mounted and connected with cords that practically no wiring in the station or in the dispatcher's office is necessary.

Fig. 3. Interior Way Station Set.

The transmission circuit is claimed to be quite superior in talking and receiving qualities. Laboratory tests are said to show up about 1½ miles of No. 19 gage cable better than the best to be purchased for this service. Actual line conditions were simulated as far as possible in these laboratory tests. Other features of interest in this system are:

First, but 14 impulses are required to call any station.

Second, by operating a key and the dial, a continuous instead of a time ring can be used.

Third, by operating another key and the dial, a separate bell can be operated at any station where installed. For

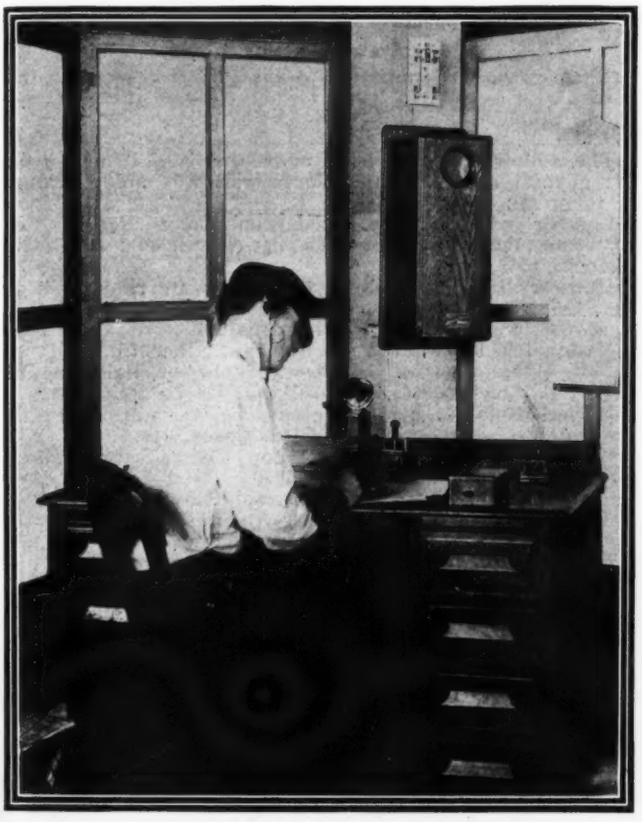


Fig. 4. The Way Station Equipment.

use in freight houses or other points outside of the office, other electrical devices can be used off this second contact, if desired.

Fourth, by operating still another key, all stations on the line can be called by one operation of the dial in the same time required to call a single station.

The above outline will show the adaptability of the equipment for the service, and the illustrations show how well protected the equipment is. Both the relay and the selector are placed under a dustproof cover and as these are the only portions having contacts, contact trouble is claimed to be practically eliminated.

How "Hand-Mike" Made a Hit.

Frank W. Pardee, vice-president and general manager of the Ericsson Mfg. Co., Buffalo, N. Y., was in TELEPHONY's office this week and was discussing business in general (with which he is mighty well pleased), and Ericsson's business in particular (over which he is tremendously enthusiastic).

In the course of the conversation we asked Mr. Pardee how it was possible for him to inflict such an outlandish name as "Hand-Mike" on such a dainty bit of mechanism as the Ericsson microphone. "Why," said Mr. Pardee, "the name fairly fixed itself. We call it officially our handy microphone, you know, and I overheard one of the boys in the factory one day refer to it as the Hand-Mike. This, I discovered was the name "for short" which the whole bunch had been applying to the instrument for some time. While it was not particularly euphonious, the abbreviation was at least catchy and easily remembered, so I just naturally appropriated the shop term and used it in my advertising.

"And let me tell you," he continued, "it was a good bet. The whole field knows now about Hand-Mike and his pretty sister—and people don't forget that name, either. Hand-Mike means the Ericsson instrument and nothing else, and any old microphone name suggests Hand-Mike to 'em, no matter who makes it.

"That advertising of mine which played up Hand-Mike and his pretty sister was featured a long time ago, but hardly a visitor at our exhibition at the La Salle Hotel, during the convention, failed to call out something to our boys about that combination. The name just naturally came right to mind when they saw the Ericsson stuff."

All of which goes to show that there is something in a name, Shakespeare to the contrary notwithstanding, and that the name which is short and snappy holds over in the human memory, particularly when coupled with quality in the thing it stands for. And if you doubt the truth of this assertion, ask Frank Pardee.

Paragraphs.

THE COFFEY SYSTEM & AUDIT CO., Indianapolis, is installing its system of telephone accounting this week for the Decatur Home Telephone Co., of Decatur, Ill., and also for the Christian County Telephone Co., of Taylorville, Ill. The company reports a lively interest in its system and a demand for its installation which is taxing its facilities to meet. The company's staff is now being augmented, however, to meet the increasing business, and it is still prepared to care for all requests promptly, despite the growing demand. Further announcement of the company's plans will be made later.

R. L. THAYER & Co. have established a warehouse at 424 S. Clinton street, Chicago, where facilities will be maintained for keeping surplus stocks of various companies to be used in emergency purposes for making quick shipments. The company has 5,000 sq. ft. of floor space and is ideally situated with relation to all railroads. R. L. Thayer, who is in charge of the company's business, is a practical telephone man of considerable experience and would be glad to receive inquiries from interested companies desiring full particulars.

THE LARSON BROS. LUMBER CO., of Winthrop, Minn., desires to announce that it has a complete stock of white cedar posts and poles, in dry stock, from which to select, and that, when this year's output is received, it will have 250,000 posts and 40,000 poles of A grade stock in its northern Minnesota yards.

Happy and Courteous Recognition of Service.

The First National Bank, in a certain town in the middle western states, remembered the operators of the local telephone exchange about the first of the year with gifts of candy. The following letter accompanied the consignments:

"To be patient when others are impatient; courteous when others are discourteous; to listen carefully to all of the tragic, serio-comic affairs of the community, and retain in memory only those things which will be of value to the employer or customer—these are a few of the many qualifications of a successful telephone operator.

Please accept this little remembrance as a reminder that we appreciate the splendid service of the past year, and that we extend to all of you the greetings of the season.

Yours truly,

P. S. Should there be any unusually *unpleasant* conversations between ourselves (married), and wives, or any unusually pleasant conversations between ourselves (single), and our sweethearts during the coming year, please 'forget it.'"

Legal Cases and Decisions

By A. H. McMillan

Loss of Horse.

"To what extent would we be held liable for the loss of a horse belonging to our subscriber who calls his own central and gets it at 12 o'clock at night, but this central cannot get our other central where a doctor is located. Later on at night subscriber is unable to get his own central until 6 a. m. When the doctor arrives, he claims the horse could have been saved had he been called before. Later in the day the horse died. We give night service at above exchanges. A lightning storm passed over at about 11 o'clock at night. We have a notice in our directory advising against the use of telephones during an electrical storm."

If the reason why the other central could not get your central was because of the electrical storm, you would not be liable for the loss of the horse. If you were negligent in not answering the call, you might be held liable, provided a jury found that the negligence was the cause of the horse's death. Glouson vs. Southern Bell Telephone & Telegraph Co., 71 Southeastern, 747.

Free Telephone Service.

"Can a Georgia city force a telephone company to furnish free telephone service or to provide free cross arms for police and fire alarm systems, or both in return for the use of its streets, alleys and lanes for the privilege of maintaining its pole lines and appurtenances along its streets?"

The above refers to Sec. 3 of an ordinance which is as follows:

"In consideration of the rights and privileges herein granted, said company shall provide one cross arm on each pole for the free use of the police and fire alarm system of the city and shall also provide a telephone both at the office of said city, and at the power plant of said city, for the free use of said city, and keep same in good condition."

A provision that the telephone company shall furnish the city a certain number of telephone instruments and telephone service without charge, is a valid condition in the franchise. New Orleans vs. Great Southern Telephone & Telegraph Co., 40 La. Ann., 41; 2 American Electrical Cases 172; 8 American State Reports, 502; 3 Southern, 533; Kensington Electric Co. vs. Philadelphia, 187 Pa. State, 446; 41 Atlantic, 309.

A provision requiring the company to allow the use of its poles for the city fire alarm system is also valid. Pensacola vs. Southern Bell Telephone & Telegraph Co. (Fla.), 37 Southern, 820. McMillan on Telephone Law, Section 66.

Interference by Induction.

"We have a 20-year franchise in our town which was granted by the town board 10 years ago. Now a certain electric light company has obtained a 20-year franchise, voted by the people of our town, and is putting up a light plant in this city. It is putting its poles and wires on the same side of the street as our telephone wires and uses the same length of poles. This throws its wires and our wires close together. In case the induction is great, can we compel it to move the poles to the opposite side of the street, or put in longer poles? In case the wires should cross with ours and cause fire, would it have to stand the damage? Will our franchise, which was granted by the town board, protect us or will we have to get a franchise from the people?"

In case the induction interferes with the operation of your line, you would have the right to protection against such interference. The later established company must pay damages and might also be restrained by injunction from stringing its wires in proximity to those of the prior established company. Prior authority to occupy, or prior occupation of the streets, does not confer upon the company getting it, any exclusive right. Any subsequently licensed company is under the duty to so maintain its wires and lines as not to interfere with the prior occupant's right to properly operate its lines and to transact the business authorized by its franchise. Nebraska Telephone Co. vs. York Gas & Electric Light Co., 27 Nebraska, 284; 3 American Electrical Cases, 364.

If the telephone company can eliminate the serious effects of induction by increasing the distance between its wires and those of the electric company, it is its duty to do so. Rocky Mountain Bell Telephone Co. vs. Salt Lake City Railway Co., 3 American Electrical Cases, 356. McMillan on Telephone Law, Section 139.

The franchise granted you by the town board will undoubtedly protect you, as a vote by the people of your town was probably not required by law at the time your franchise was granted.

Electrolysis Affecting Cable.

"Please cite me references to cases where traction companies have been held liable for electrolysis affecting telephone cable."

The following cases bear upon the subject and state the general rule, although electrolysis was not a feature of them all:

Cumberland Telephone & Telegraph Co. vs. Railway Co., 93 Tenn., 492, 4 American Electric Cases, 297; 29 Southwestern 104.

Hudson River Telephone Co. vs. Watervliet Railway Co., 135 New York, 394, 642, 32 Northeastern, 148; 31 A. S. R. 838, 4 American Electric cases 275.

National Telephone Co. vs. Baker, L. R. 2 Ch. Div. 186.

Bell Telephone Co. vs. Montreal Street Railway Co., Rap. Jud., Quebec 6 Cour. Du. Banc., De La Rein, 223.

Rocky Mountain Bell Telephone Co. vs. Salt Lake City Railway Co., 3 American Electric Cases, 356.

Wisconsin Telephone Co. vs. Eau Claire Street Railway Co., 3 American Electric Cases 383.

Cumberland Telephone & Telegraph Co. vs. United States Railway Co., 42 Federal 273; 3 American Electric Cases 408.

Peoria Water Works Co. vs. Central Railway Co., U. S. Circuit Court, October 5, 1910.

Designation of Streets by City.

The laws of New Jersey (P. L. 331, 332) give companies organized for supplying and distributing electricity, power to use the highways and streets for poles, provided that no poles should be erected in the street of an incorporated city or town without designation by the city or town of the street in which they shall be placed, being first obtained. This proviso is held not to affect poles placed in the streets of a town before the incorporation of a company but to apply to any place therein after its incorporation.

A later act (P. L. 458) declares all proceedings heretofore taken by cities, purporting to authorize construction of pole lines by electric companies, shall be taken to be legal and to have authorized the construction, and that such companies which shall have so constructed such lines in the streets, shall be deemed to have in the streets all legal authority necessary to be secured from such municipality in order lawfully to construct and maintain such pole lines in such streets.

This act is held to be intended to apply to and validate only the municipal proceedings necessary for the construction of such pole lines. It is also held that poles erected in a street of a town after it was incorporated, without the necessary authority from it, were not legalized because, before it was incorporated, the township out of which the town was formed and from which no authority was necessary, had designated all its streets for such poles. Public Service Corporation vs. Town of Westfield, 84 Atlantic, 718.

Drop Wire Over Private Property.

"In running a drop wire from a pole to the subscriber's premises, it was run diagonally across another man's property and came within three feet of a porch. Can the owner refuse to let wires be strung across his property?"

The owner can legally refuse to let wires be strung over his property. The ownership of one's property extends from the center of the earth to the heavens and the crossing of a man's land with a wire, even though it does not touch the land, and is not supported by poles on the land, amounts to a trespass.